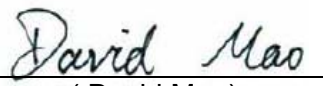
FCC&IC Radio Test Report

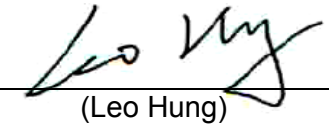
FCC ID: OP5PL5569
IC: 3534A-PL5569

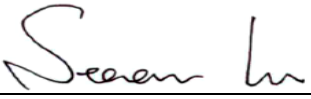
This report concerns (check one): ■ **Original Grant** □ **Class II Change**

Issued Date	: Sep. 09, 2013
Project No.	: 1308C255
Equipment	: SKAA iPod Transmitter
Model Name	: PL5557-S
Applicant	: Eleven Engineering Inc.
Address	: 10150 - 100 Street, Suite 800 Edmonton, AB, Canada T5J 0P6 Canada

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Aug. 30, 2013
Date of Test: Aug. 30, 2013~ Sep. 06, 2013

Testing Engineer : 
(David Mao)

Technical Manager : 
(Leo Hung)

Authorized Signatory : 
(Steven Lu)

Neutron Engineering Inc.
No.3,Jinshagang 1st Road, ShiXia,
Dalang Town, Dong Guan, China.
TEL: 0769-8318-3000
FAX: 0769-8319-6000

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **CHINA**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Table of Contents Page

Table of Contents Page

Table of Contents **Page**

1. CERTIFICATION

Equipment	:	SKAA iPod Transmitter
Brand Name	:	SKAA; Izabella
Model Name	:	PL5557-S
Applicant	:	Eleven Engineering Inc.
Manufacturer	:	AML Industrial Electronic Ltd.
Address	:	10150 - 100 Street, Suite 800 Edmonton, AB, Canada T5J 0P6 Canada
Factory	:	Eleven Engineering Inc.
Address	:	10150 - 100 Street, Suite 800 Edmonton, AB, Canada T5J 0P6 Canada
Date of Test	:	Aug. 30, 2013~ Sep. 06, 2013
Test Item	:	ENGINEERING SAMPLE
Standard(s)	:	FCC Part15, Subpart C(15.247) / ANSI C63.4 : 2009 FCC Public Notice DA 00-705, March 30, 2000. Canada RSS-210:2010 RSS-GEN Issue 3, Dec 2010

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1308C255) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): 47 CFR Part 15, Subpart C; Canada RSS-210:2010				
Standard(s) Section		Test Item	Judgment	Remark
RSS-210 RSS-GEN Issue 3, Dec 2010	**47 CFR Part 15**			
RSS-GEN Issue 3, Dec 2010 7.2.4	15.207	Conducted Emission	PASS	
RSS-210, Issue 8, Annex 8, Section 8.5	15.247(d)	Antenna conducted Spurious Emission	PASS	
RSS-210, Issue 8, Annex 8, Section A8.1(b)	15.247 (a)(1)	Hopping Channel Separation	PASS	
RSS-210 Annex 8 (A8.1b)	15.247 (b)(1)	Peak Output Power	PASS	
RSS-210, Issue 8, Annex 8, Section 8.5	15.247(d) 15.209	Radiated Spurious Emission	PASS	
RSS-210, Issue 8, Annex 8, Section A8.1(d)	15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS	
RSS-210, Issue 8, Annex 8, Section A8.1(d)	15.247 (a)(1)(iii)	Dwell Time	PASS	
RSS-GEN Issue 3, Dec 2010 7.2.2	15.205	Restricted Bands	PASS	
RSS-210, Issue 8, Annex 8, Section A8.4	15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this test report.

(2) According to FCC Public Notice DA 00-705, March 30, 2000.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/DG-CB03** at the location of No.3,Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792
Neutron's test firm number for FCC 319330
Neutron's test firm number is 4428B-1

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U，(dB)	NOTE
DG-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)	NOTE
DG-CB03	CISPR	9K~30MHz	V	3.79	
		9K~30MHz	H	3.57	
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	
		18GHz~40GHz	V	4.15	
		18GHz~40GHz	H	4.14	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>SKAA iPod Transmitter</td></tr>
<tr><td>Brand Name</td><td>SKAA; Izabella</td></tr>
<tr><td>Model Name</td><td>PL5557-S</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>
<table>
<tr><td>Operation Frequency:</td><td>2403.585~2477.313 MHz</td></tr>
<tr><td>Modulation Technology:</td><td>FSK</td></tr>
<tr><td>Bit Rate of Transmitter:</td><td>1Mbps</td></tr>
<tr><td>Number Of Channel</td><td>49 CH, Please see note 2. (Page 10)</td></tr>
<tr><td>Antenna Designation:</td><td rowspan="2">Please see note 3. (Page 10)</td></tr>
<tr><td>Antenna Gain(Peak)</td></tr>
<tr><td>Peak Output Power:</td><td>11.19 dBm (Max)</td></tr>
<tr><td>AVG Output Power:</td><td>3.36dBm (Max)</td></tr>
</table>
More details of EUT technical specification, please refer to the User's Manual.
</td></tr>
<tr><td>Power Source</td><td>Supplied from host system.</td></tr>
<tr><td>Power Rating</td><td>DC 5V</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.

Channel List					
Ch Number	Center Frequency (MHz)	Ch Number	Center Frequency (MHz)	Ch #	Center Frequency (MHz)
1	2403.585	18	2429.697	35	2455.809
2	2405.121	19	2431.233	36	2457.345
3	2406.657	20	2432.769	37	2458.881
4	2408.193	21	2434.305	38	2460.417
5	2409.729	22	2435.841	39	2461.953
6	2411.265	23	2437.377	40	2463.489
7	2412.801	24	2438.913	41	2465.025
8	2414.337	25	2440.449	42	2466.561
9	2415.873	26	2441.985	43	2468.097
10	2417.409	27	2443.521	44	2469.633
11	2418.945	28	2445.057	45	2471.169
12	2420.481	29	2446.593	46	2472.705
13	2422.017	30	2448.129	47	2474.241
14	2423.553	31	2449.665	48	2475.777
15	2425.089	32	2451.201	49	2477.313
16	2426.625	33	2452.737		
17	2428.161	34	2454.273		

Only 15 channels are hopping randomly at one time during test.

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed	N/A	4.55

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode **NOTE (1)**
Mode 2	Wireless

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Conducted Emission	
Final Test Mode	Description
Mode 2	Wireless

For Radiated Emission	
Final Test Mode	Description
Mode 1	TX Mode **NOTE (1)**

Note:

(1) The measurements are performed at the high, middle, low available channels.

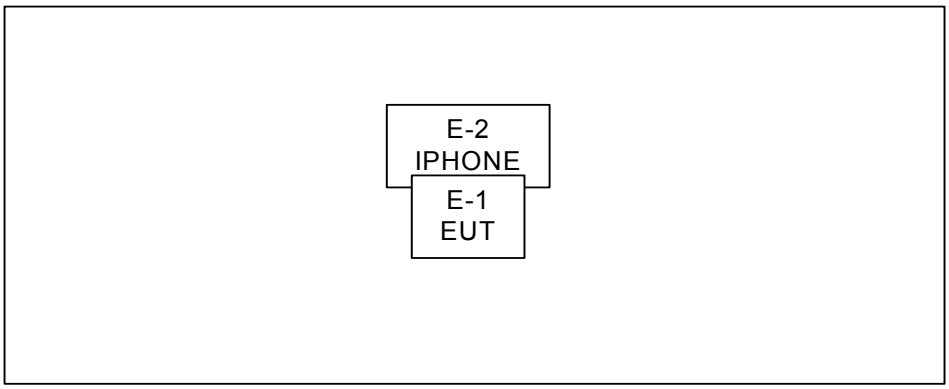
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

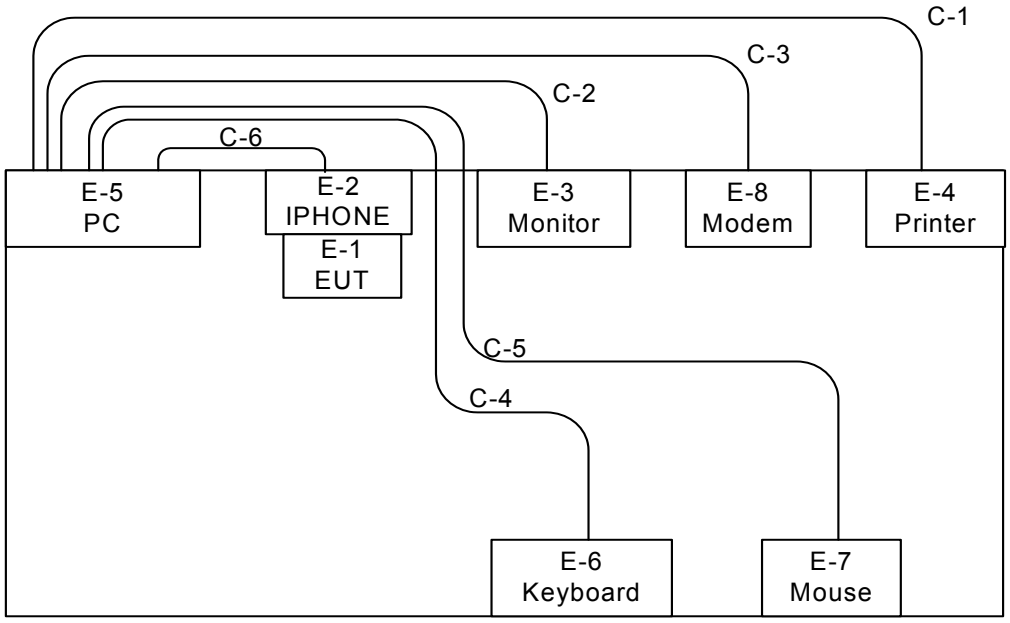
Test software version	NA		
Frequency	2403.585MHz	2438.913MHz	2477.313MHz
Parameters-1Mbps	N/A	N/A	N/A

3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated



Conducted



C-1 Parallel Cable
C-2 D-Sub Cable
C-3 RS232 Cable
C-4 USB Cable
C-5 USB Cable
C-6 USB Cable

3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID/IC	Series No.	Note
E-1	SKAA iPod Transmitter	SKAA; Izabella	PL5557-S	OP5PL5569 3534A-PL5569	N/A	EUT
E-2	IPHONE	Apple	A1241	BCGA1241	N/A	
E-3	LCD monitor	Dell	E177FPc	DOC	CNOFJ179-641 80-6AG-1WNS	
E-4	Printer	SII	DPU-414	DOC	3018507 B	
E-5	PC	Dell 745	DCSM	DOC	G7K832X	
E-6	USB Keyboard	Dell	L100	DOC	CNORH659658 9085C00U7	
E-7	USB Mouse	Dell	MO56UOA	DOC	G01003HO	
E-8	Modem	ACEEX	DM-1414V	IFAXDM1414	0603002131	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.5m	
C-2	YES	YES	1.5m	
C-3	YES	NO	0.9m	
C-4	YES	NO	1.5m	
C-5	YES	NO	1.5m	
C-6	NO	NO	1m	

Note:

(1) For detachable type I/O cable should be specified the length in m in『Length』column.

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	Apr. 25, 2014
2	LISN	R&S	ENV216	100087	Nov.16.2013
3	Test Cable	N/A	C_17	N/A	Mar.15.2014
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	Apr. 25, 2014
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Apr. 25, 2014

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

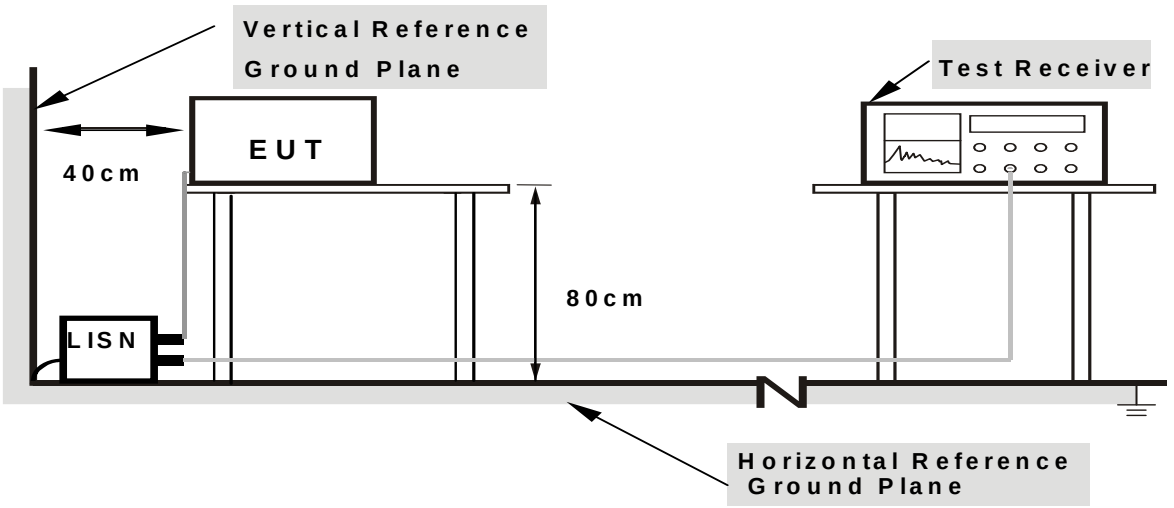
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.6 EUT OPERATING CONDITIONS

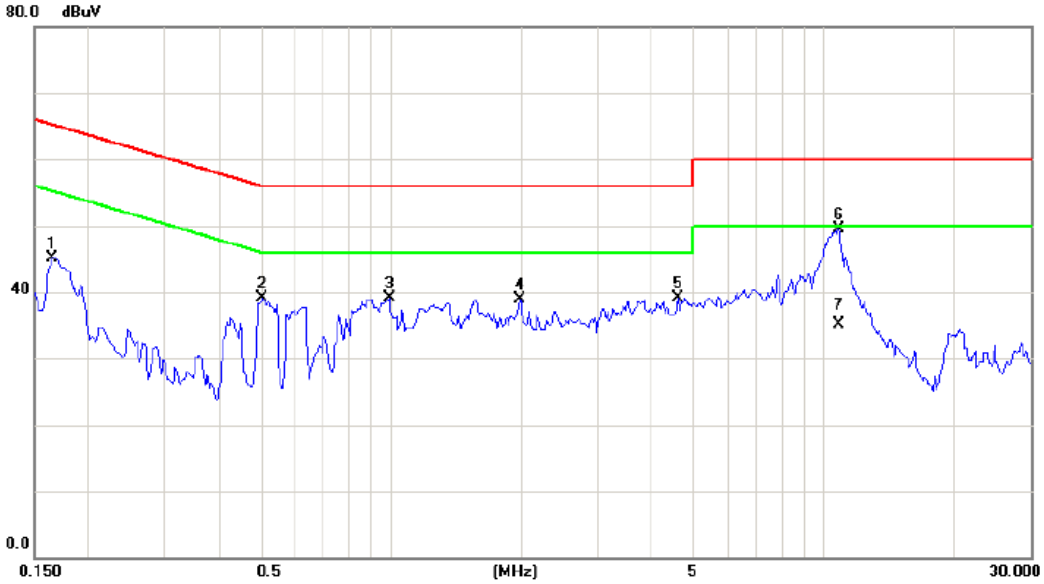
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.
The EUT is continued Transmitter/Receive data or Hopping on mode.

4.1.7 TEST RESULTS

Remark

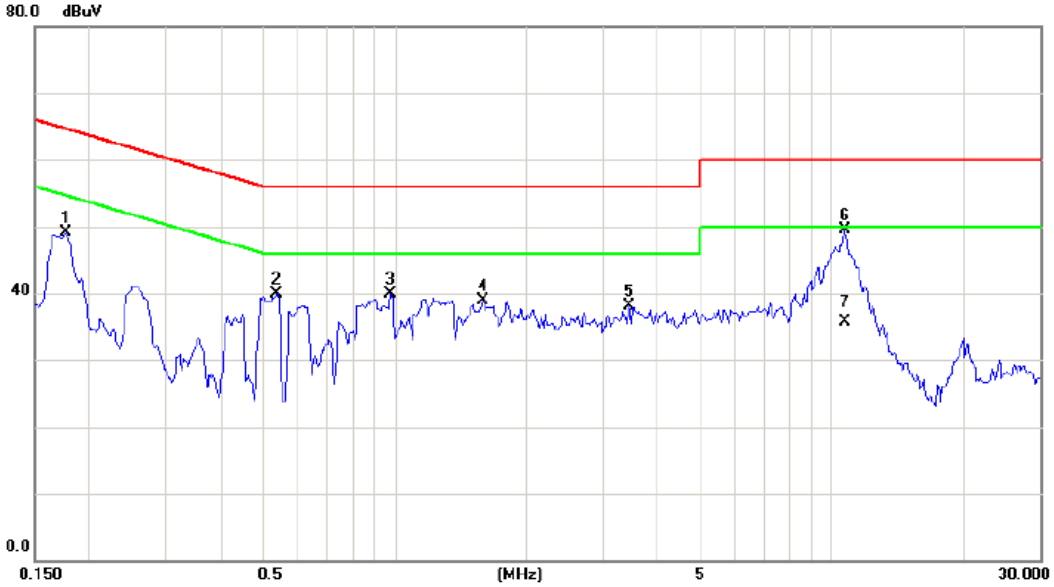
(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a " * " marked in AVG Mode column of Interference Voltage Measured.
(2) Measuring frequency range from 150KHz to 30MHz.
(3) " N/A" denotes test is not applicable in this test report.

EUT:	SKAA iPod Transmitter	Model Name:	PL5557-S
Temperature:	26 ℃	Relative Humidity:	53 %
Test Power:	AC 120V/60Hz	Phase:	Line
Test Mode:	Wireless		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1655	35.54	9.63	45.17	65.18	-20.01	peak	
2		0.5050	29.44	9.70	39.14	56.00	-16.86	peak	
3		0.9937	29.36	9.74	39.10	56.00	-16.90	peak	
4		1.9898	29.00	9.84	38.84	56.00	-17.16	peak	
5		4.6131	29.27	9.90	39.17	56.00	-16.83	peak	
6	*	10.8280	39.42	10.11	49.53	60.00	-10.47	peak	
7		10.8280	25.09	10.11	35.20	50.00	-14.80	AVG	

EUT:	SKAA iPod Transmitter	Model Name:	PL5557-S
Temperature:	26 ℃	Relative Humidity:	53 %
Test Power:	AC 120V/60Hz	Phase:	Horizontal
Test Mode:	Wireless		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1773	39.42	9.71	49.13	64.61	-15.48	peak	
2		0.5403	30.14	9.74	39.88	56.00	-16.12	peak	
3		0.9820	30.08	9.77	39.85	56.00	-16.15	peak	
4		1.5950	29.11	9.83	38.94	56.00	-17.06	peak	
5		3.4375	28.25	9.90	38.15	56.00	-17.85	peak	
6	*	10.7614	39.30	10.23	49.53	60.00	-10.47	peak	
7		10.7614	25.43	10.23	35.66	50.00	-14.34	AVG	

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 40 GHz, whichever is lower

4.2.2 MEASUREMENT INSTRUMENTS LIST ANS SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Apr. 25, 2014
2	Amplifier	HP	8447D	2944A09673	Apr. 25, 2014
3	Test Receiver	R&S	ESCI	100382	Apr. 25, 2014
4	Test Cable	N/A	C-01_CB03	N/A	Jun.30.2014
5	Antenna	ETS	3115	00075789	Apr. 25, 2014
6	Amplifier	Agilent	8449B	3008A02274	Apr. 25, 2014
7	Spectrum	Agilent	E4408B	US39240143	Nov. 16.2013
8	Test Cable	HUBER+SUHNER	C-45	N/A	Apr. 30, 2014
9	Controller	CT	SC100	N/A	N/A
10	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Apr. 25, 2014
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct.12.2013
12	Horn Antenna	EMCO	3115	9605-4803	Apr. 25, 2014

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

Channel: TX 2403.585MHz

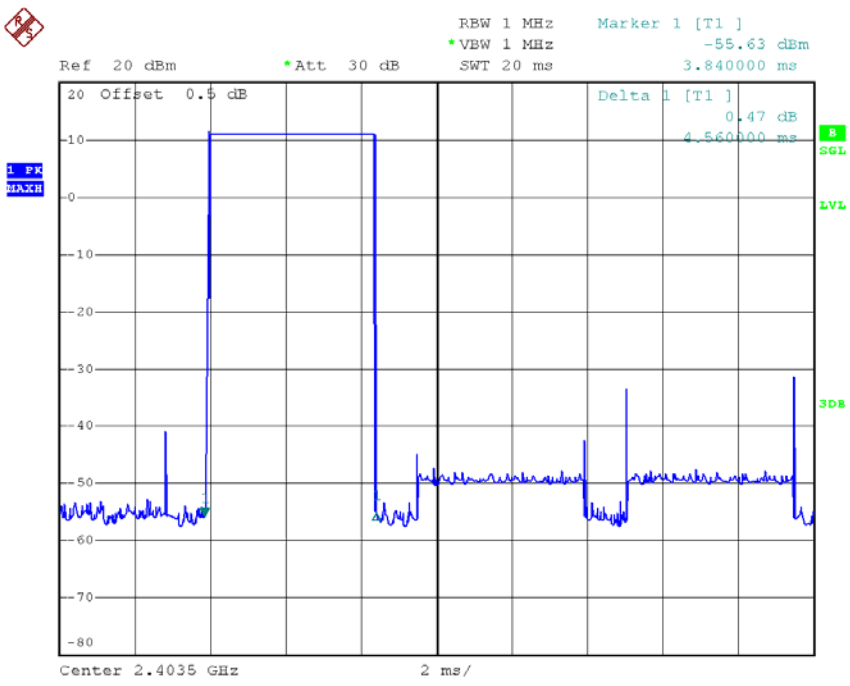
Duty Cycle=ON/(ON+OFF)

Duty Cycle=4.56/83.4

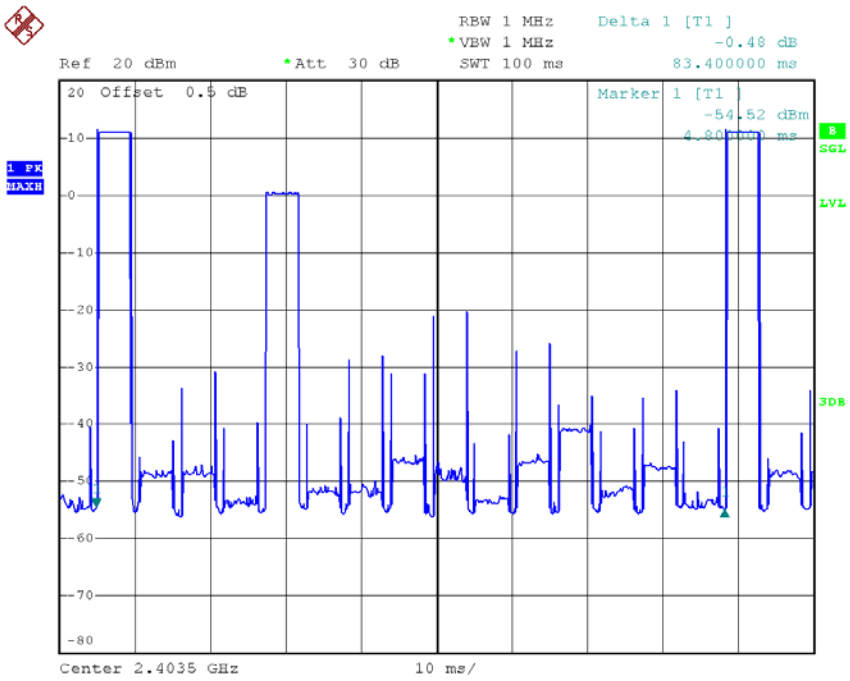
Average = Peak value +20log (Duty cycle)

Final AV=PK-25.24

ON Time=4.56msec



Total：83.4msec



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4.2.3 TEST PROCEDURE

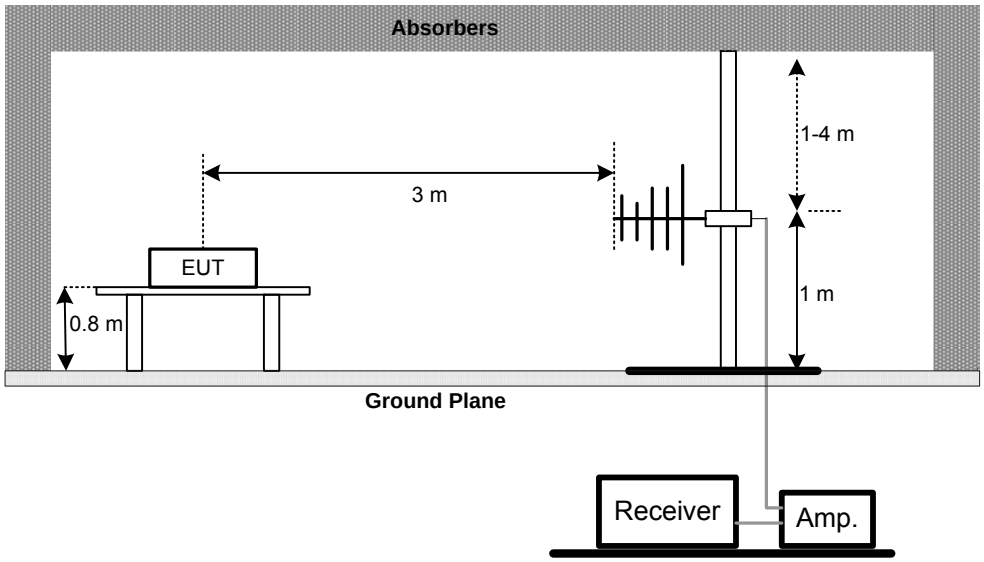
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.4 DEVIATION FROM TEST STANDARD

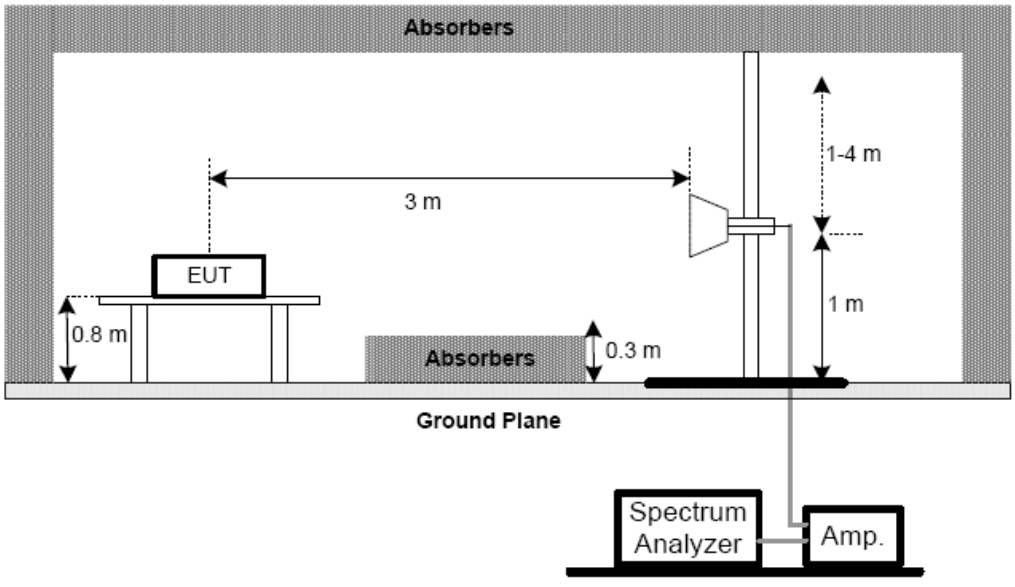
No deviation

4.2.5 TEST SETUP

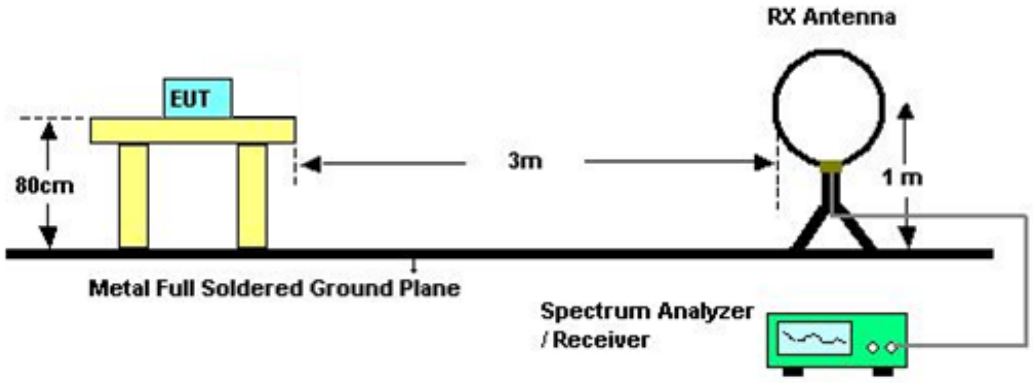
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For radiated emissions below 30MHz



4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **4.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.7 TEST RESULTS (BELOW 30MHZ)

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	AC 120V/60Hz
Test Mode ：	TX MODE		

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0094	0°	16.52	24.30	40.82	128.18	-87.36	AVG
0.0094	0°	19.39	24.30	43.69	148.18	-104.49	PK
0.0158	0°	18.47	24.30	42.77	123.63	-80.86	AVG
0.0158	0°	20.27	24.30	44.57	143.63	-99.06	PK
0.0245	0°	18.16	24.02	42.18	119.82	-77.65	AVG
0.0245	0°	20.65	24.02	44.67	139.82	-95.16	PK
0.0369	0°	17.64	23.23	40.87	116.26	-75.39	AVG
0.0369	0°	20.40	23.23	43.63	136.26	-92.63	PK
0.4275	0°	18.08	19.97	38.05	94.99	-56.93	AVG
0.4275	0°	20.56	19.97	40.53	114.99	-74.45	PK
1.4850	0°	20.37	19.55	39.92	64.17	-24.25	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0094	90°	17.17	24.30	41.47	128.19	-86.72	AVG
0.0094	90°	20.43	24.30	44.73	148.19	-103.46	PK
0.0264	90°	17.34	23.89	41.23	119.17	-77.94	AVG
0.0264	90°	20.65	23.89	44.54	139.17	-94.63	PK
0.0372	90°	18.15	23.21	41.36	116.19	-74.83	AVG
0.0372	90°	20.45	23.21	43.66	136.19	-92.53	PK
0.0548	90°	18.27	22.30	40.57	112.83	-72.25	AVG
0.0548	90°	20.56	22.30	42.86	132.83	-89.96	PK
0.2650	90°	18.27	20.36	38.63	99.14	-60.51	AVG
0.2650	90°	20.53	20.36	40.89	119.14	-78.25	PK
1.7250	90°	19.69	19.53	39.22	69.54	-30.32	QP

Remark：

(1) The amplitude of spurious emissions which are attenuated by more than 20 dB belc the permissible value has no need to be reported ◦

(2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB); ◦

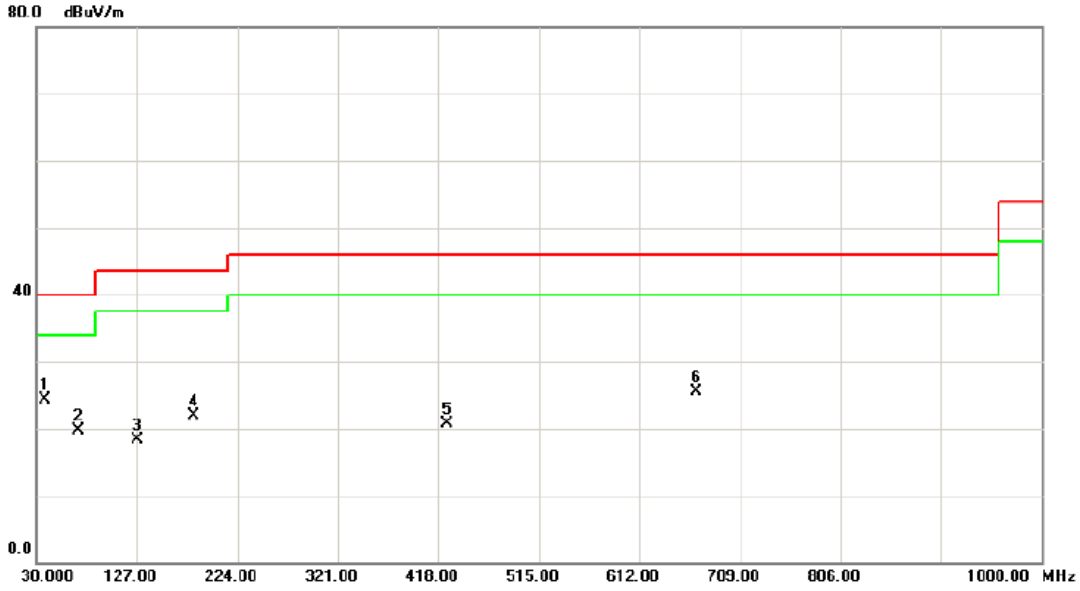
(3) Limit line = specific limits (dBuV) + distance extrapolation factor. ◦

4.2.8 TEST RESULTS (BETWEEN30 – 1000 MHZ)

Remark：

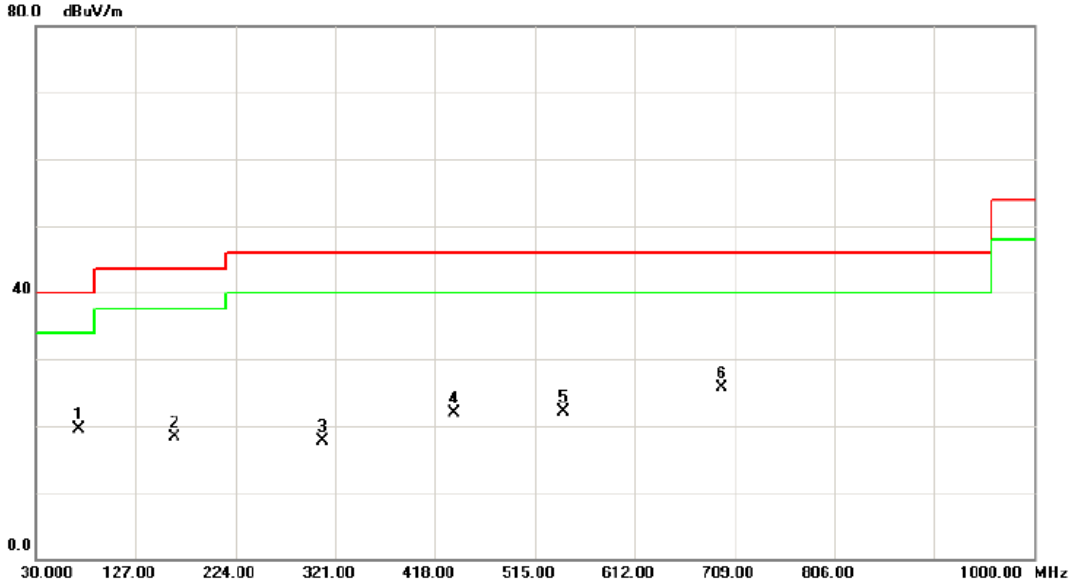
(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform.
(3) Measuring frequency range from 30MHz to 1000MHz.
(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Mode 2403.585MHz	Polarization:	Vertical



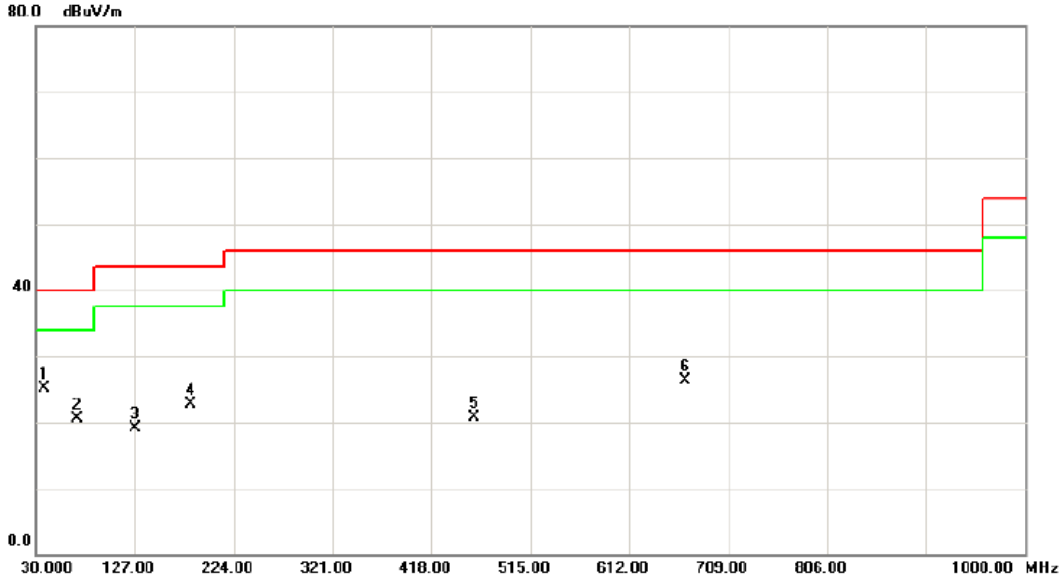
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	37.7600	39.18	-14.88	24.30	40.00	-15.70	peak	
2		70.7400	36.07	-16.37	19.70	40.00	-20.30	peak	
3		127.0000	31.87	-13.50	18.37	43.50	-25.13	peak	
4		182.2900	35.02	-13.18	21.84	43.50	-21.66	peak	
5		425.7600	30.18	-9.38	20.80	46.00	-25.20	peak	
6		667.2900	30.88	-5.31	25.57	46.00	-20.43	peak	

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Mode 2403.585MHz	Polarization:	Horizontal



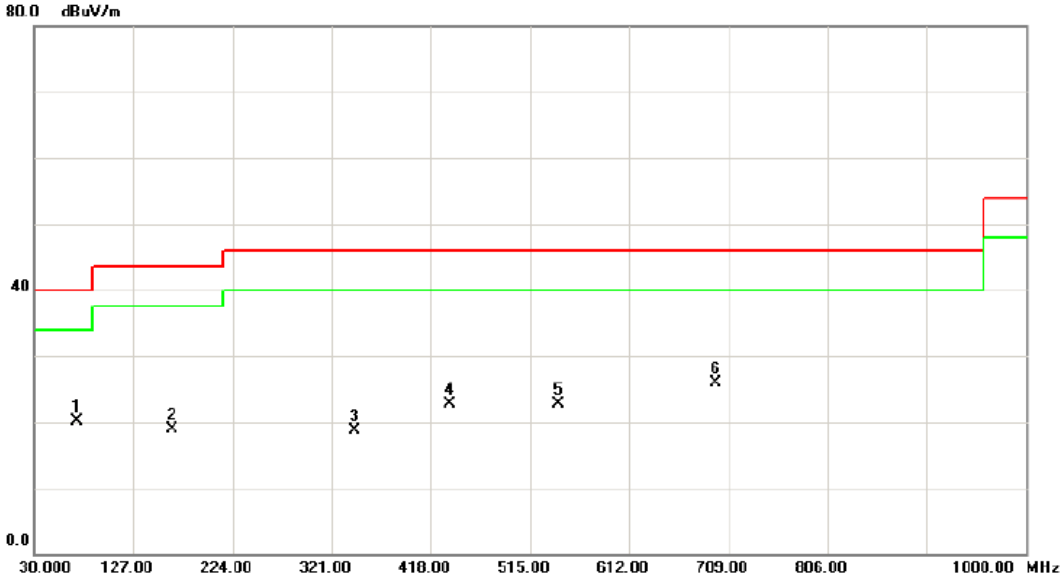
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		71.7100	35.93	-16.46	19.47	40.00	-20.53	peak	
2		164.8300	31.50	-13.21	18.29	43.50	-25.21	peak	
3		308.3900	29.03	-11.29	17.74	46.00	-28.26	peak	
4		436.4300	31.14	-9.17	21.97	46.00	-24.03	peak	
5		543.1300	30.04	-8.02	22.02	46.00	-23.98	peak	
6	*	696.3900	30.58	-4.87	25.71	46.00	-20.29	peak	

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Mode 2438.913MHz	Polarization:	Vertical



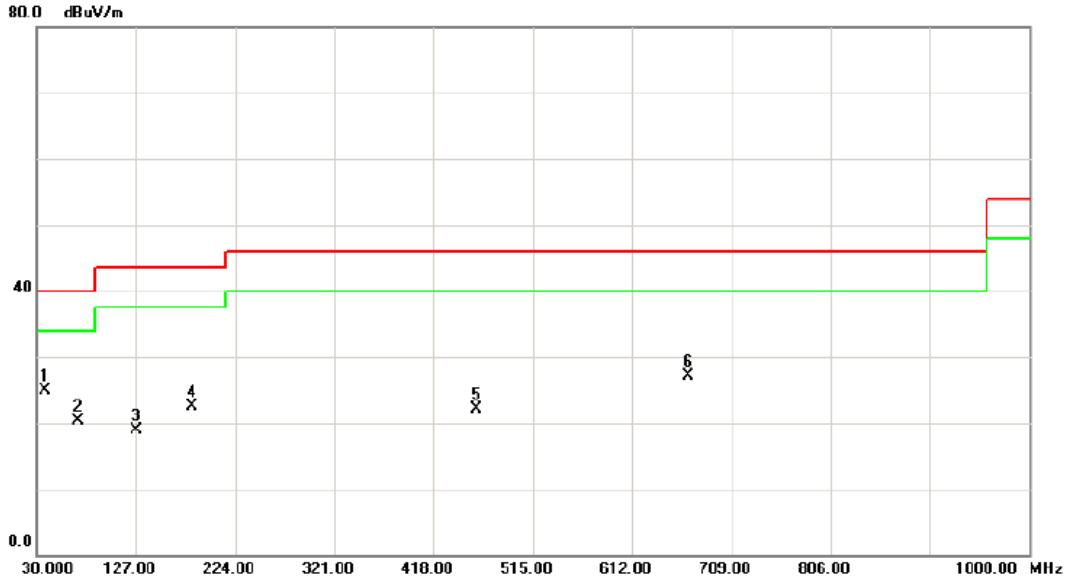
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	37.7600	39.96	-14.88	25.08	40.00	-14.92	peak	
2		70.7400	36.85	-16.37	20.48	40.00	-19.52	peak	
3		127.0000	32.65	-13.50	19.15	43.50	-24.35	peak	
4		182.2900	35.81	-13.18	22.63	43.50	-20.87	peak	
5		459.7100	29.93	-9.19	20.74	46.00	-25.26	peak	
6		667.2900	31.66	-5.31	26.35	46.00	-19.65	peak	

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Mode 2438.913MHz	Polarization:	Horizontal



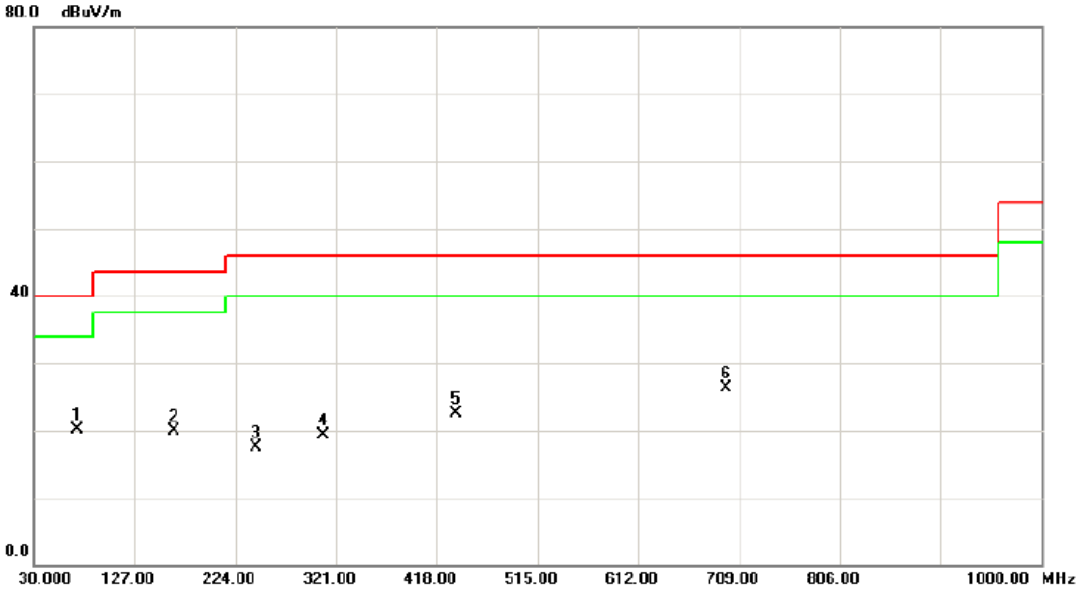
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	71.7100	36.62	-16.46	20.16	40.00	-19.84	peak	
2		164.8300	32.19	-13.21	18.98	43.50	-24.52	peak	
3		343.3100	30.10	-11.44	18.66	46.00	-27.34	peak	
4		436.4300	31.83	-9.17	22.66	46.00	-23.34	peak	
5		543.1300	30.73	-8.02	22.71	46.00	-23.29	peak	
6		696.3900	30.77	-4.87	25.90	46.00	-20.10	peak	

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Mode 2477.313MHz	Polarization:	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	37.7600	39.80	-14.88	24.92	40.00	-15.08	peak	
2		70.7400	36.69	-16.37	20.32	40.00	-19.68	peak	
3		127.0000	32.49	-13.50	18.99	43.50	-24.51	peak	
4		182.2900	35.64	-13.18	22.46	43.50	-21.04	peak	
5		459.7100	31.27	-9.19	22.08	46.00	-23.92	peak	
6		667.2900	32.50	-5.31	27.19	46.00	-18.81	peak	

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX Mode 2477.313MHz	Polarization:	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		71.7100	36.54	-16.46	20.08	40.00	-19.92	peak	
2		164.8300	33.11	-13.21	19.90	43.50	-23.60	peak	
3		243.4000	32.30	-14.87	17.43	46.00	-28.57	peak	
4		308.3900	30.64	-11.29	19.35	46.00	-26.65	peak	
5		436.4300	31.75	-9.17	22.58	46.00	-23.42	peak	
6	*	696.3900	31.19	-4.87	26.32	46.00	-19.68	peak	

4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX 2403.585MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Margin		Note
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	24.22	-1.02	34.09	58.31	33.07	74.00	54.00	-15.69	-20.93	X/E
2403.15	**V**	**70.75**	**45.51**	**34.13**	**104.88**	**79.64**					**X/F**
4808.02	V	49.65	24.41	6.39	56.04	30.80	74.00	54.00	-17.96	-23.20	X/H
7212.10	V	57.73	32.49	11.93	69.66	44.42	74.00	54.00	-4.34	-9.58	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency."F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .

(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

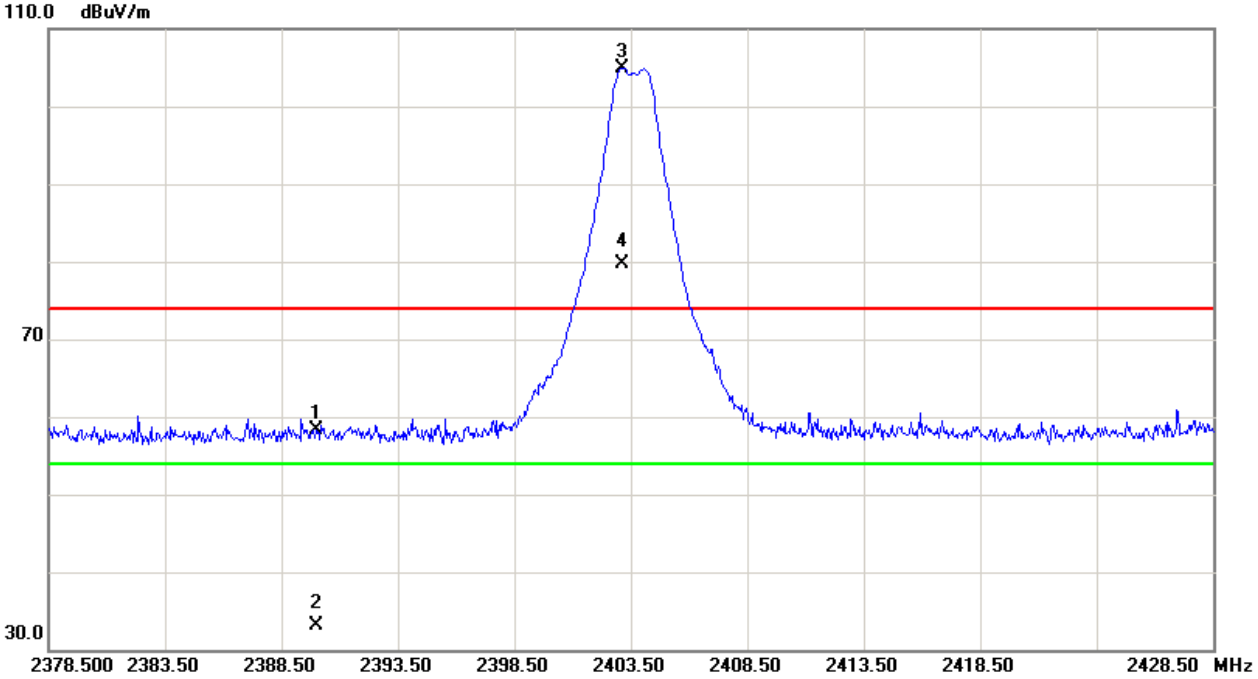
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

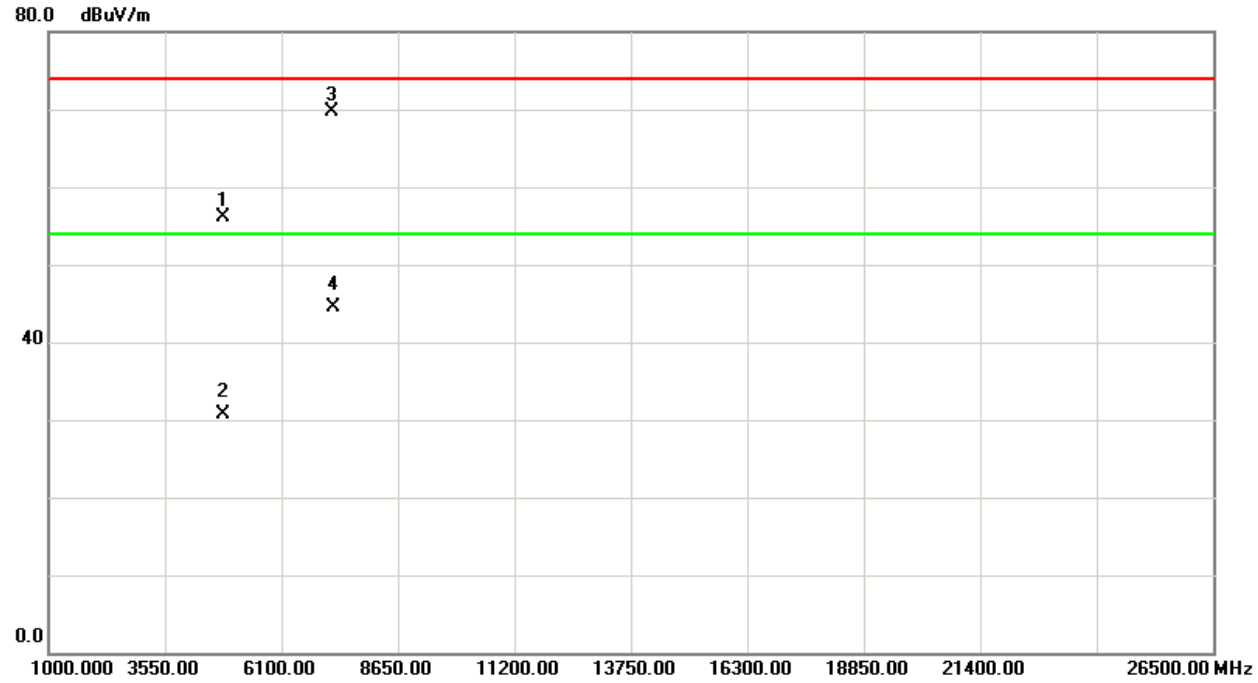
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(8) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ， Final AV=PK-25.24

TX 2403.585MHz(Above 1000 MHz, Vertical)





EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010hPa	Test Voltage ：	DC 5V
Test Mode ：	TX 2403.585MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Margin		Note
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	H	23.44	-1.80	34.09	57.53	32.29	74.00	54.00	-16.47	-21.71	X/E
2403.20	**H**	**68.11**	**24.87**	**34.13**	**102.24**	**59.00**					**X/F**
4808.05	H	45.36	20.12	6.39	51.75	26.51	74.00	54.00	-22.25	-27.49	X/H
7212.13	H	52.28	27.04	11.93	64.21	38.97	74.00	54.00	-9.79	-15.03	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency."F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .

(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

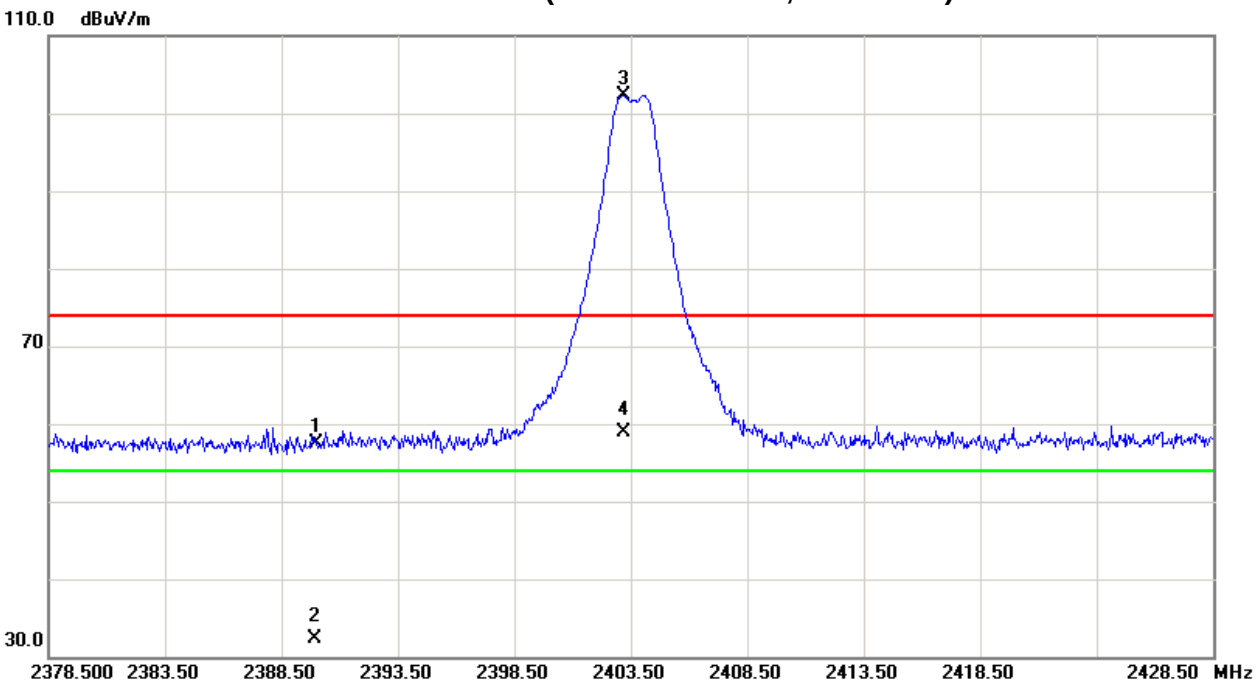
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

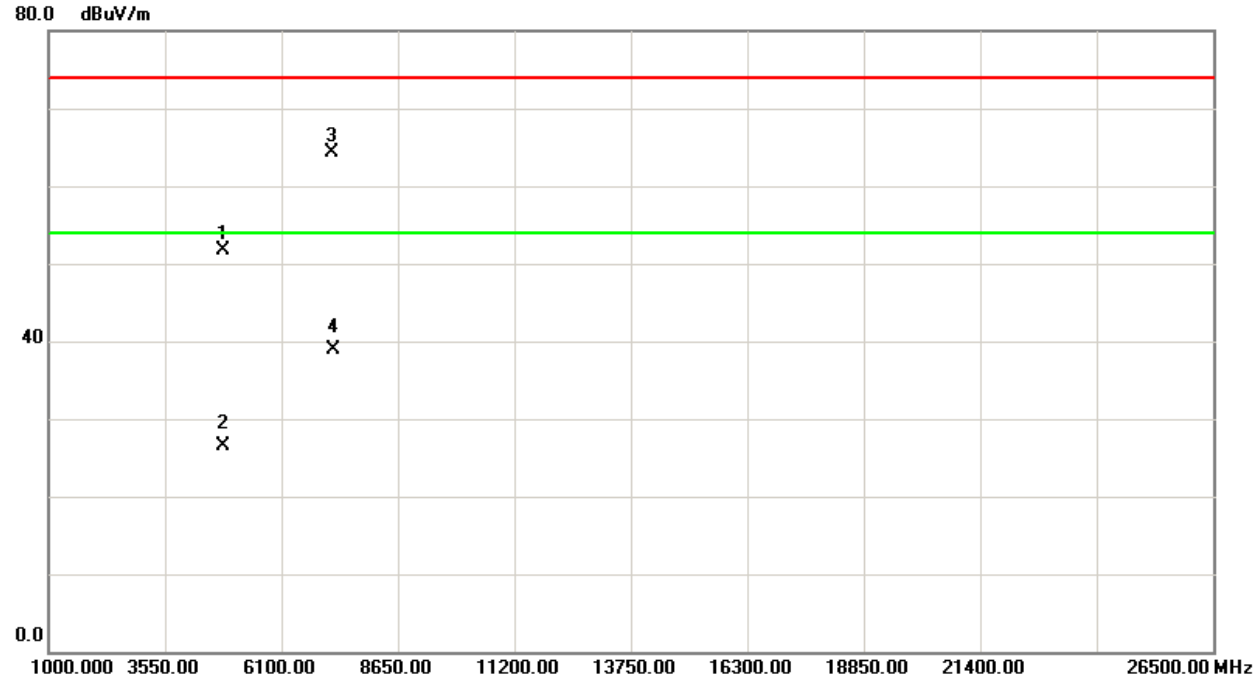
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(8) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ， Final AV=PK-25.24

TX 2403.585MHz(Above 1000 MHz, Horizontal)





EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX 2438.913MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Margin		Note
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	dBuV/m	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2438.50	**V**	**72.86**	**47.62**	**34.23**	**107.09**	**81.85**					**X/F**
4877.64	V	50.12	24.88	6.60	56.72	31.48	74.00	54.00	-17.28	-22.52	X/H
7315.75	V	57.68	32.44	12.15	69.83	44.59	74.00	54.00	-4.17	-9.41	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency."F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .

(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

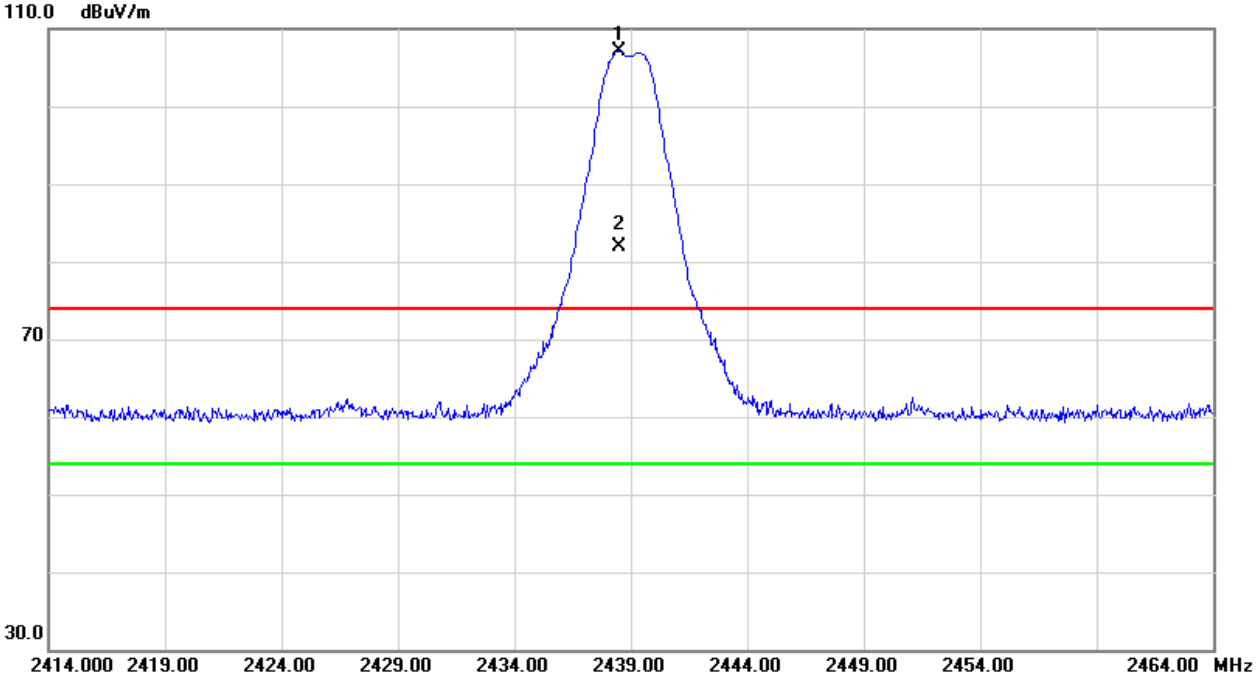
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

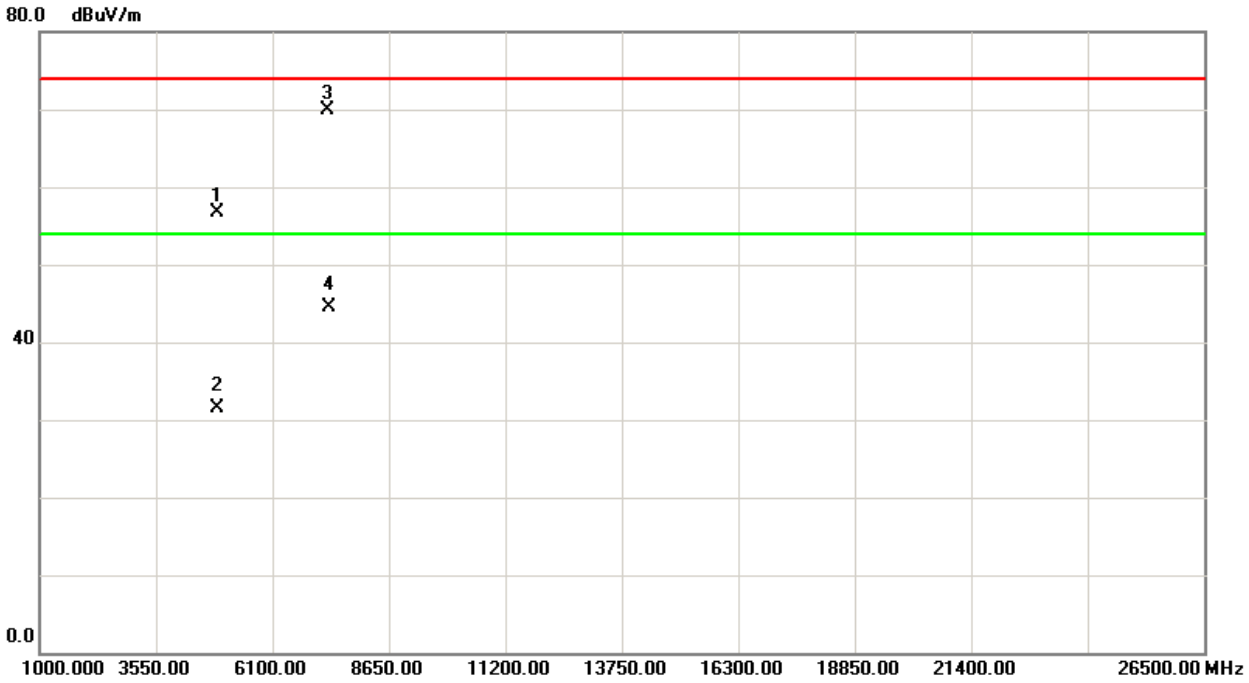
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(8) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ， Final AV=PK-25.24

TX 2438.913MHz (Above 1000 MHz, Vertical)





EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX 2438.913MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Margin		Note
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	dBuV/m	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2438.50	**H**	**70.82**	**45.58**	**34.23**	**105.05**	**79.81**					**X/F**
4877.08	H	46.43	21.19	6.60	53.03	27.79	74.00	54.00	-20.97	-26.21	X/H
7315.86	H	53.12	27.88	12.15	65.27	40.03	74.00	54.00	-8.73	-13.97	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency."F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .

(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

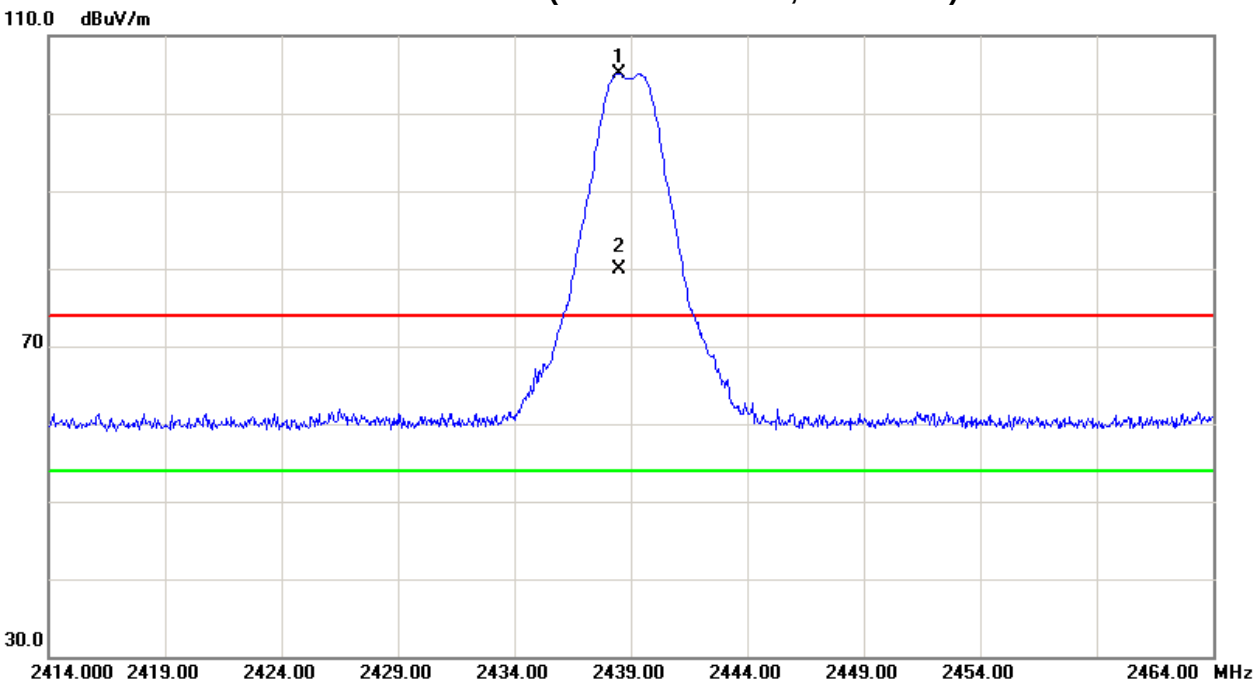
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

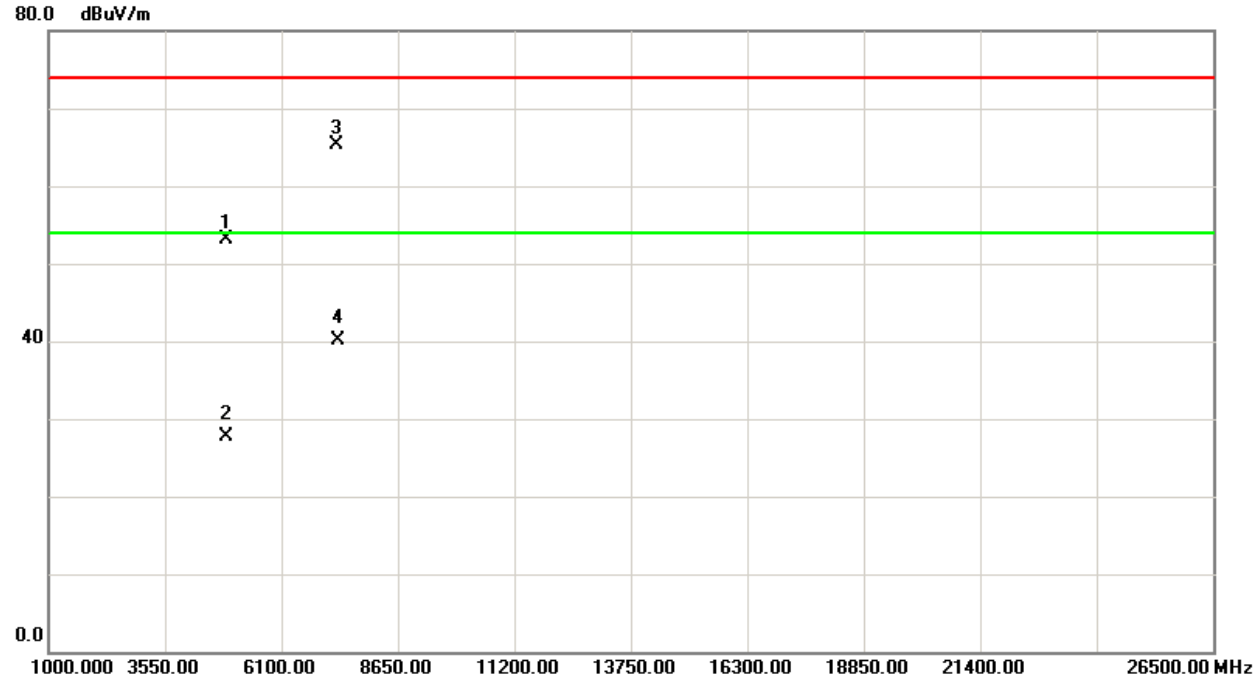
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(8) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ， Final AV=PK-25.24

TX 2438.913MHz (Above 1000 MHz, Horizontal)





EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010hPa	Test Voltage ：	DC 5V
Test Mode ：	TX 2477.313MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Margin		Note
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2476.80	**V**	**70.96**	**45.72**	**34.35**	**105.31**	**80.07**					**X/F**
2483.50	V	25.40	0.16	34.37	59.77	34.53	74.00	54.00	-14.23	-19.47	X/E
4956.78	V	49.37	24.13	6.82	56.19	30.95	74.00	54.00	-17.81	-23.05	X/H
7433.15	V	56.79	31.55	12.39	69.18	43.94	74.00	54.00	-4.82	-10.06	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency."F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .

(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

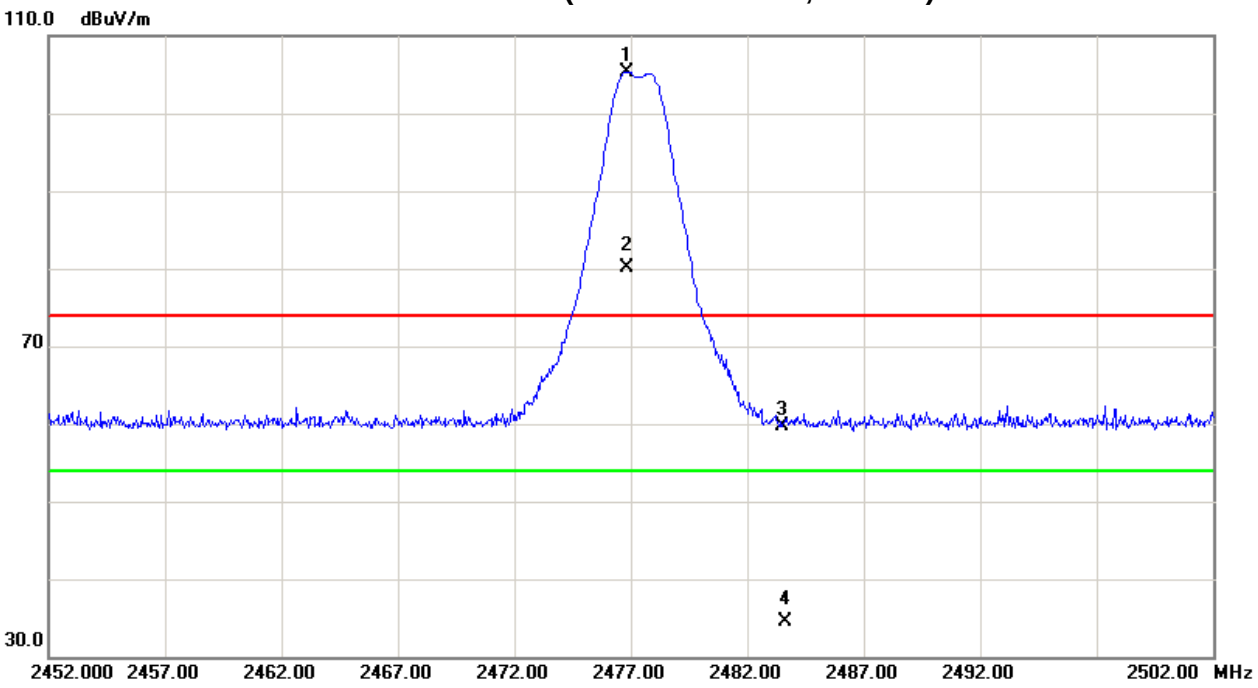
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

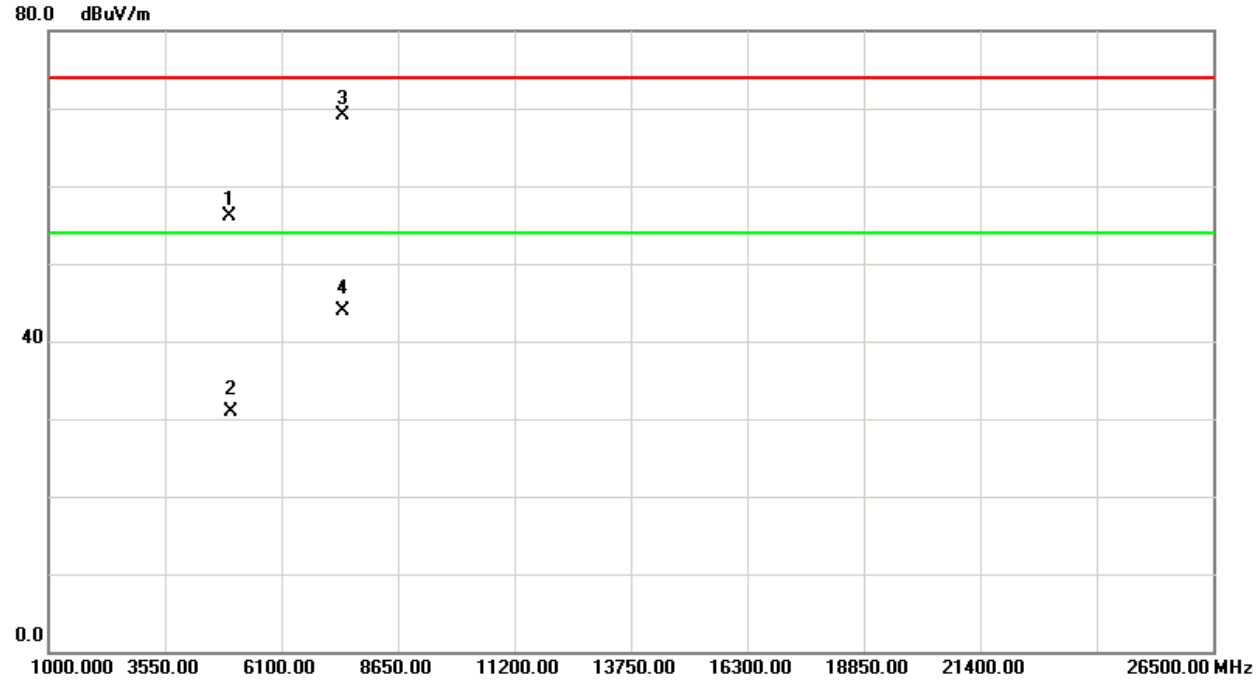
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(8) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ， Final AV=PK-25.24

TX 2477.313MHz(Above 1000 MHz, Vertical)





EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1010 hPa	Test Voltage ：	DC 5V
Test Mode ：	TX 2477.313MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Margin		Note
		Peak	AV		Peak	AV	Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2476.85	**H**	**69.48**	**44.24**	**34.35**	**103.83**	**78.59**					**X/F**
2483.50	H	26.34	1.10	34.37	60.71	35.47	74.00	54.00	-13.29	-18.53	X/E
4956.12	H	45.95	20.71	6.82	52.77	27.53	74.00	54.00	-21.23	-26.47	X/H
7433.48	H	52.49	27.25	12.39	64.88	39.64	74.00	54.00	-9.12	-14.36	X/H

Remark：

(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency."F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)

(3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .

(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

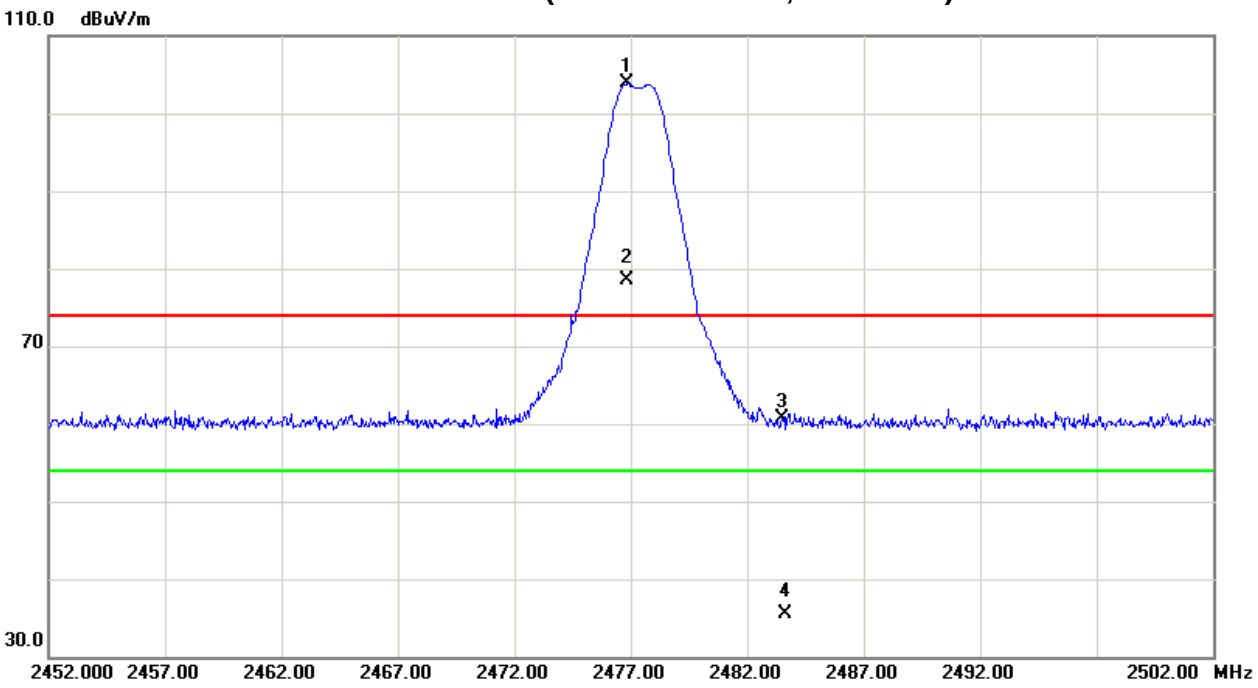
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

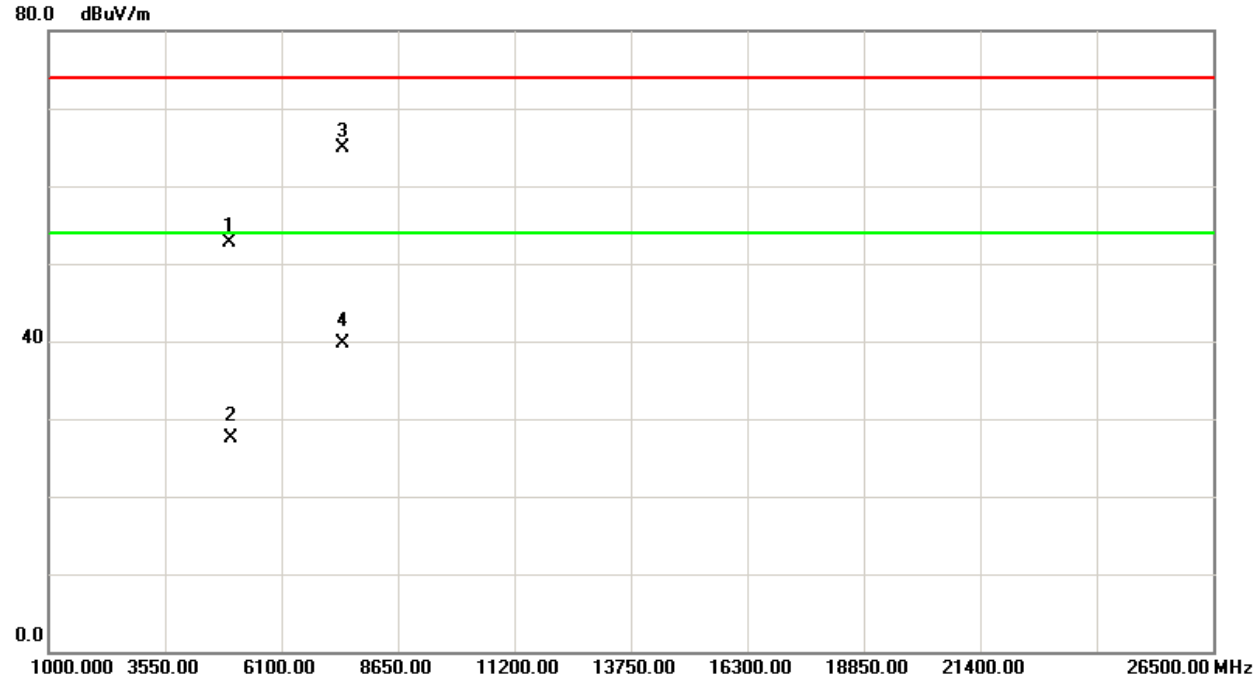
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(8) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ， Final AV=PK-25.24

TX 2477.313MHz(Above 1000 MHz, Horizontal)





5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS

5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

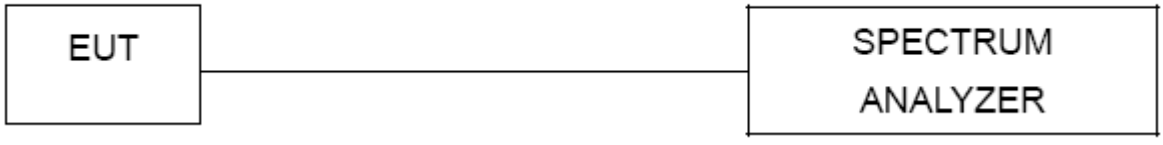
5.1.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

5.1.3 DEVIATION FROM STANDARD

No deviation.

5.1.4 TEST SETUP



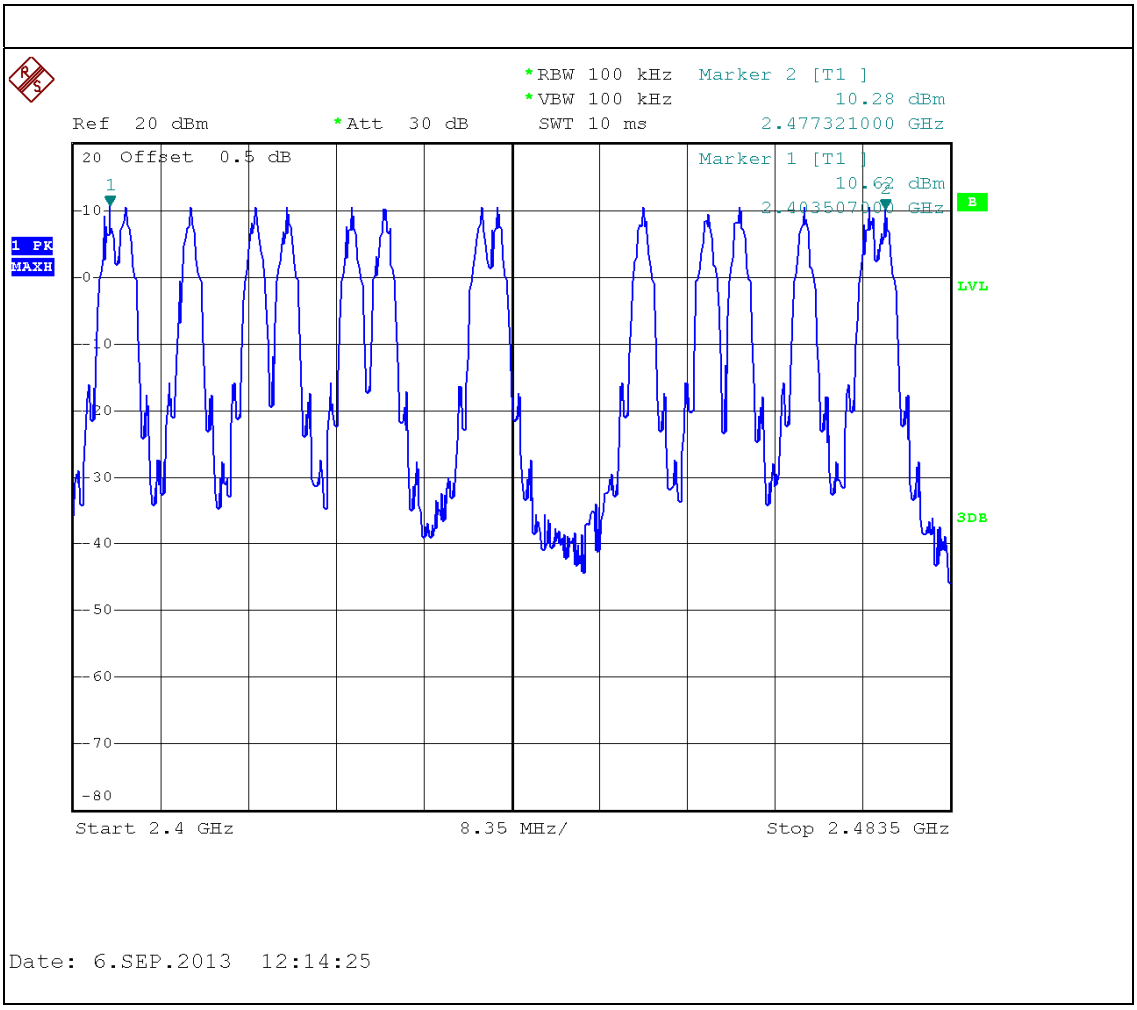
5.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.6 TEST RESULTS

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Voltage ：	DC 5V
Test Mode ：	Hopping Mode		

Number of Hopping Channel	15



6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.1.1 MEASUREMENT INSTRUMENTS LIST

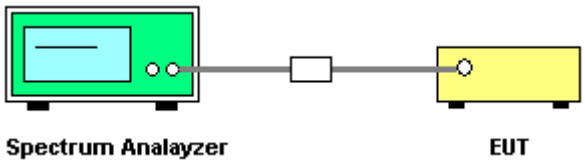
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

6.1.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. Dwell time = [spreading rate/16] x duty-cycle x 0.4 seconds

6.1.3. TEST SETUP LAYOUT



6.1.4. TEST DEVIATION

There is no deviation with the original standard.

6.1.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting/Hopping mode.

6.1.6. TEST RESULTS

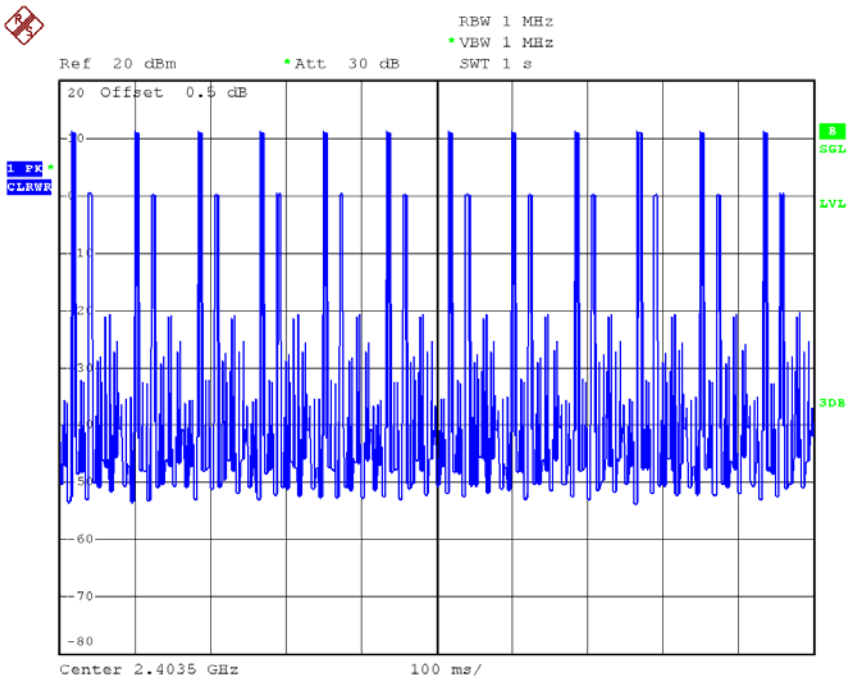
EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Voltage ：	DC 5V
Test Mode ：	Hopping Mode		

Mode	Number of transmission in a 6(15Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
2477.313 MHz	(12/1) *6=72 times **Note1**	4.56	328.32	400

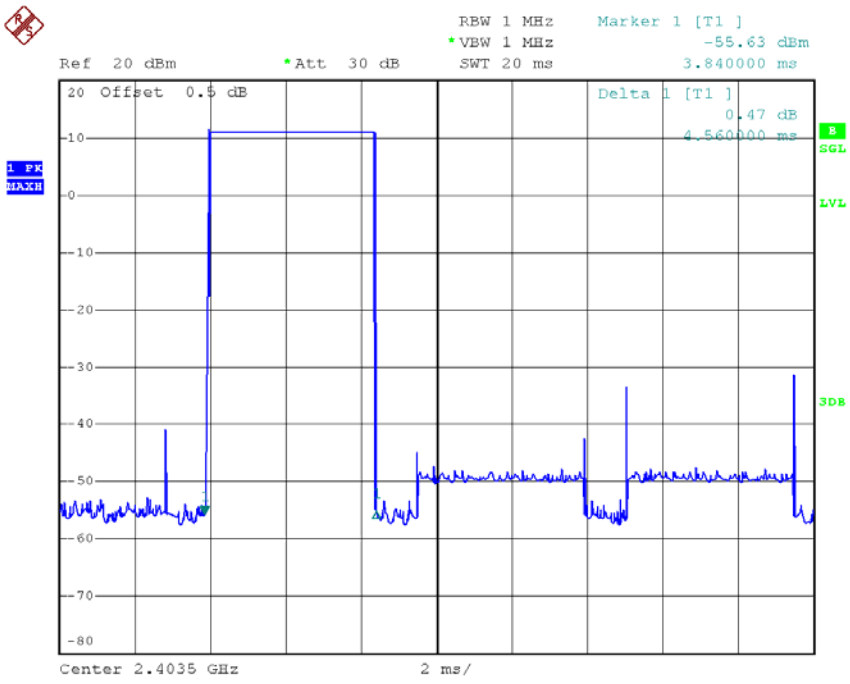
Note1: 12 times of occupied channels per 1 second

	Results
Measured cycle (sec)	15 CH*0.4=6
The total number of frequency-hopping per second	((12/1)*6)=72
The number of occupied channels per second	72/6=12(number/sec)
occupied time for each channel(1)	4.56ms
The total number of channels occupied within one cycle (2)	(12/1) *6=72times
The average time of occupancy within one cycle(1)*(2)	328.32 msec
LIMIT (msec)	400msec

Hopping Mode : 12(times/1sec)



Date: 6.SEP.2013 15:53:55



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7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

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

7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

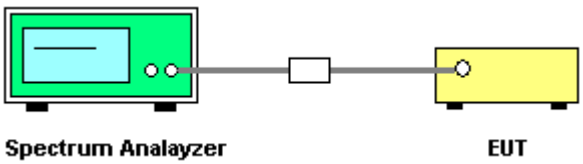
7.1.2 TEST PROCEDURE

a. The EUT must have its hopping function enabled
b. Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

7.1.3 DEVIATION FROM STANDARD

No deviation.

7.1.4 TEST SETUP



7.1.5 EUT OPERATION CONDITIONS

The EUT was programmed to be in hopping mode.

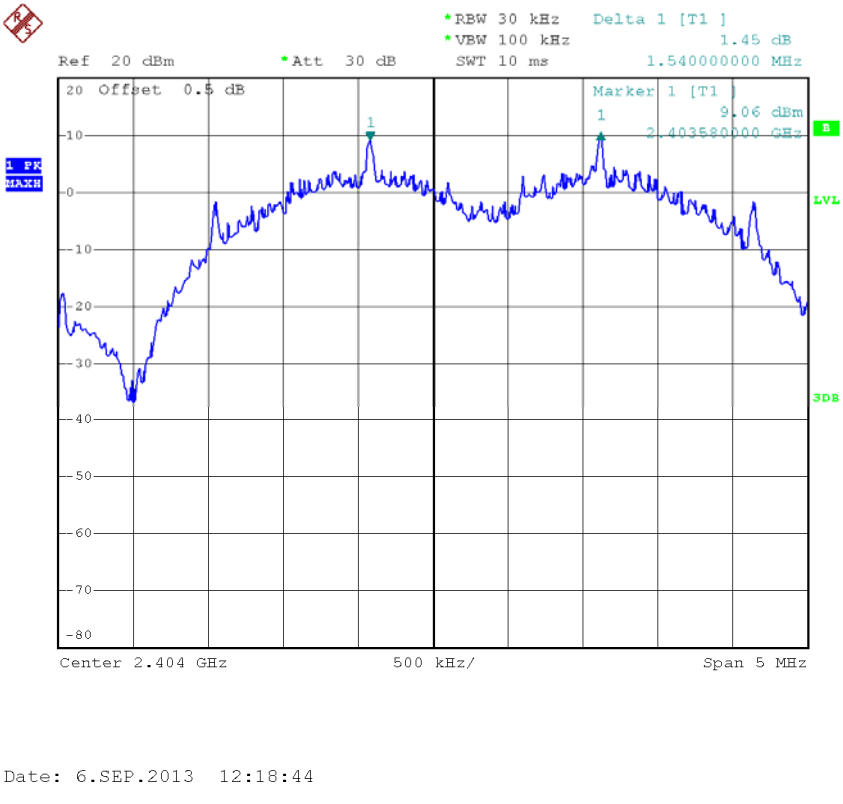
7.1.6 TEST RESULTS

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Voltage ：	DC 5V
Test Mode ：	CH01 / CH24 / CH49		

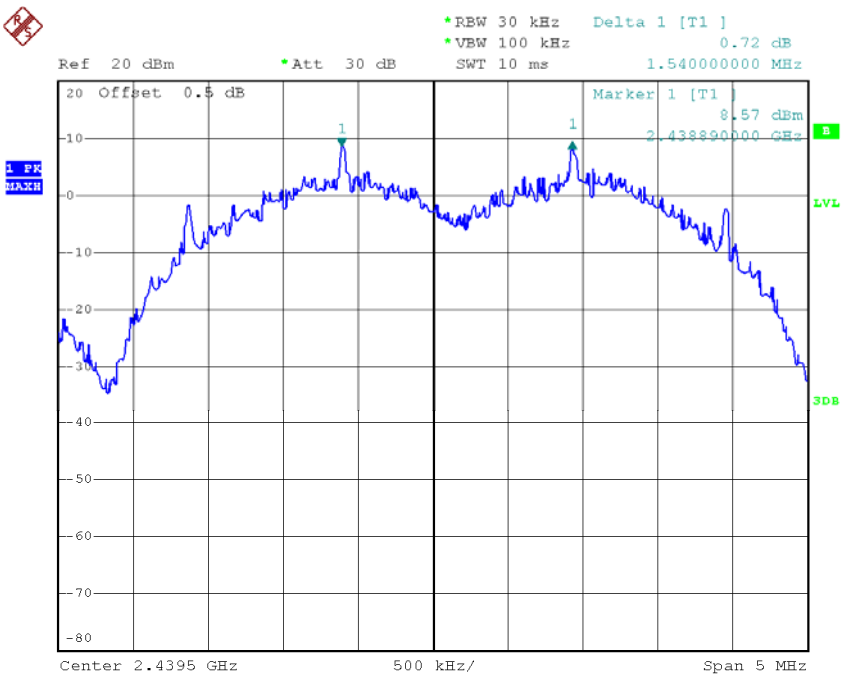
Frequency (MHz)	Ch. Separation (MHz)	2/3 of the 20 dB bandwidth (MHz)	Result
2403.585	1.540	1.487	**Complies**
2438.913	1.540	1.493	**Complies**
2477.313	1.550	1.493	**Complies**

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth

2403.585MHz



2438.913MHz



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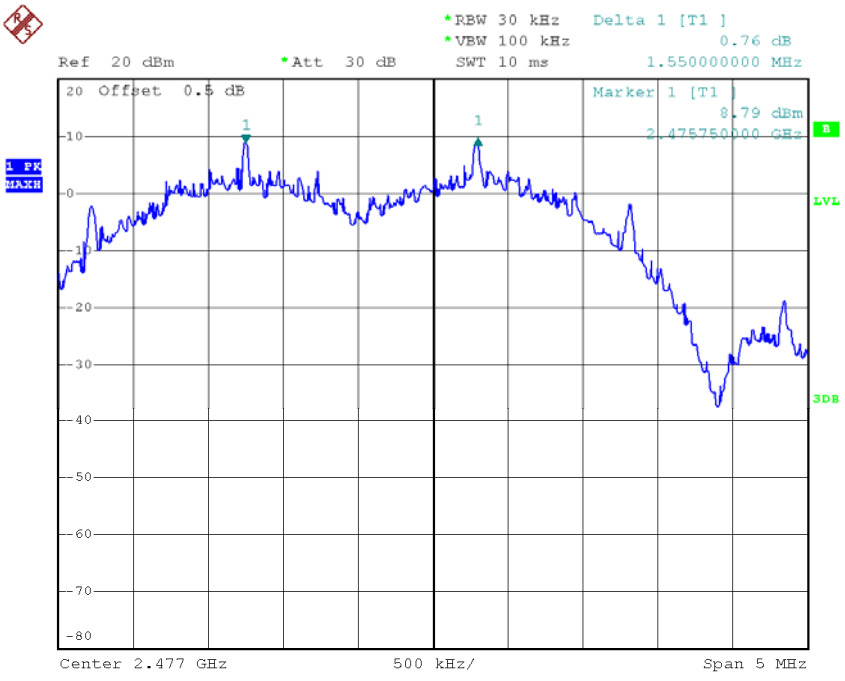
2477.313MHz



Date: 6.SEP.2013 12:19:55

8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247 (a)(1)	Bandwidth	2400-2483.5	PASS

8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

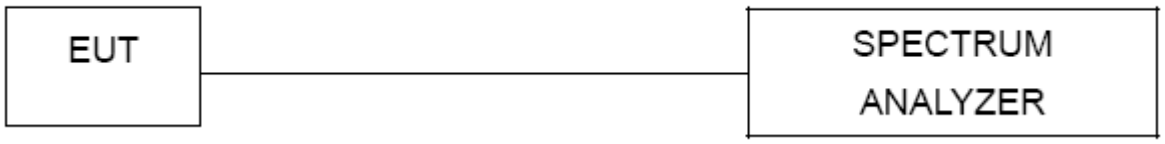
8.1.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.1.3 DEVIATION FROM STANDARD

No deviation.

8.1.4 TEST SETUP



8.1.5 EUT OPERATION CONDITIONS

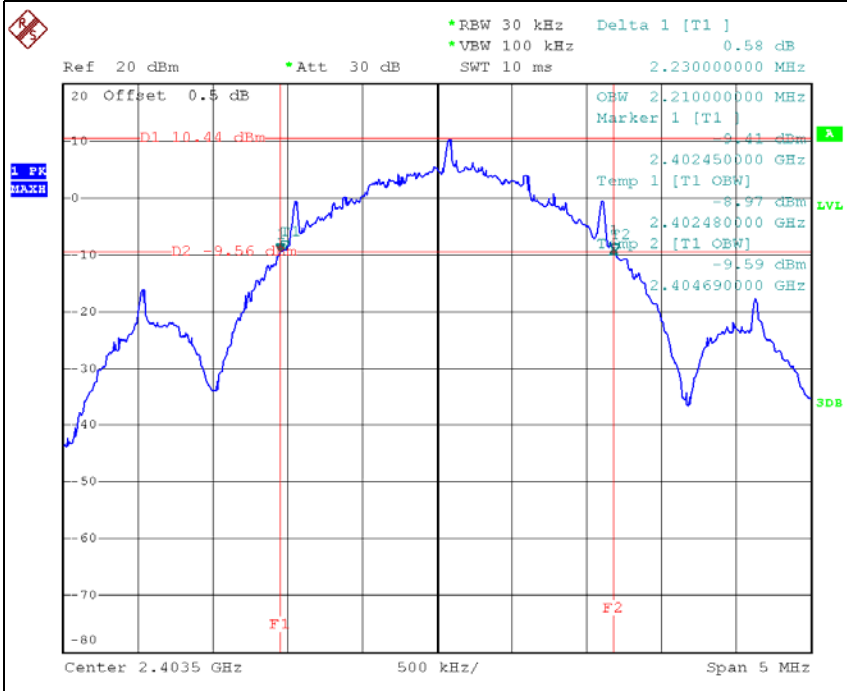
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.6 TEST RESULTS

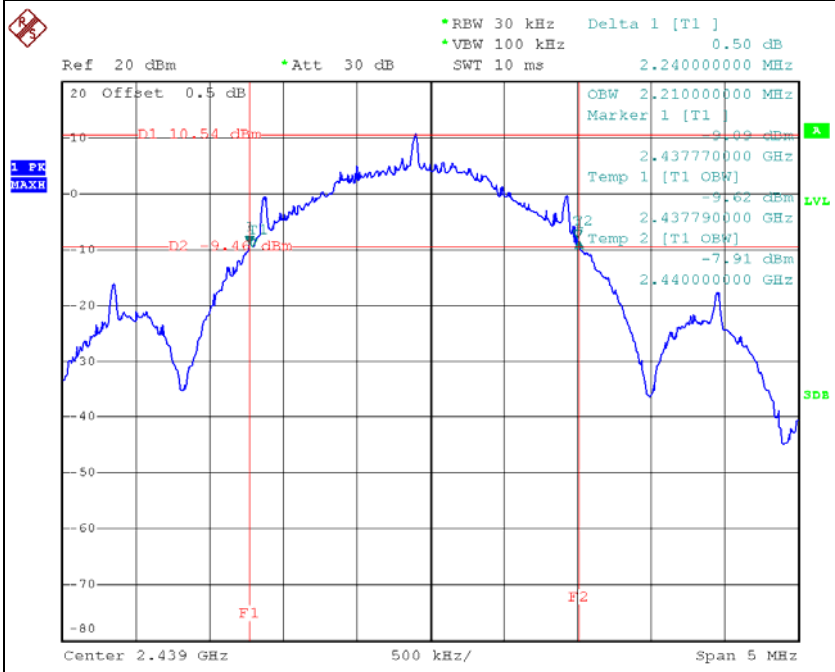
EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Voltage ：	DC 5V
Test Mode ：	CH01 / CH24 / CH49		

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Result
2403.585	2.230	2.210	**PASS**
2438.913	2.240	2.210	**PASS**
2477.313	2.240	2.220	**PASS**

2403.585MHz



2438.913MHz



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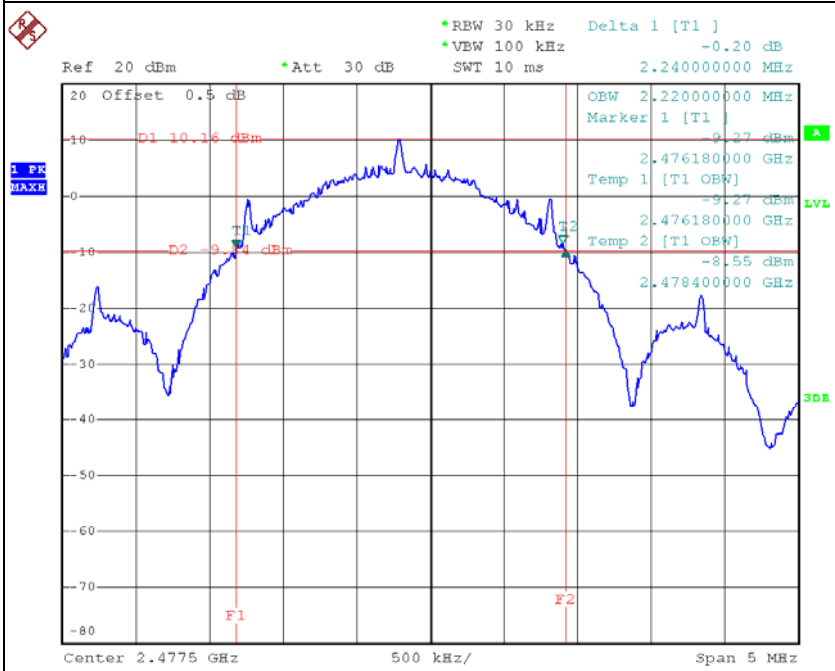
2477.313MHz



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9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

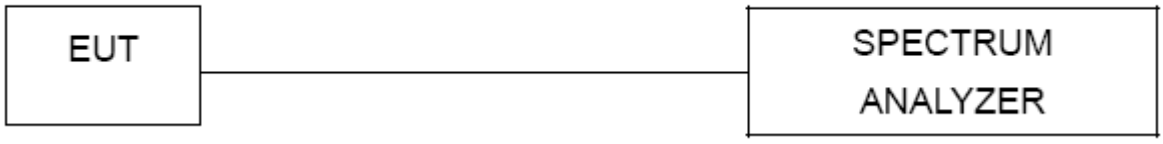
9.1.2 TEST PROCEDURE

a. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram below,

9.1.3 DEVIATION FROM STANDARD

No deviation.

9.1.4 TEST SETUP



9.1.5 EUT OPERATION CONDITIONS

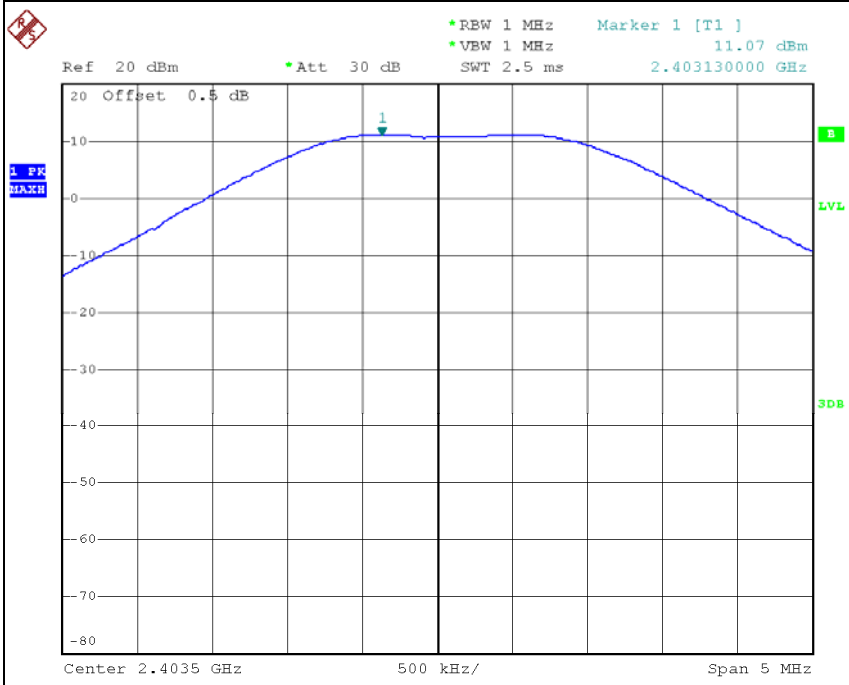
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

9.1.6 TEST RESULTS

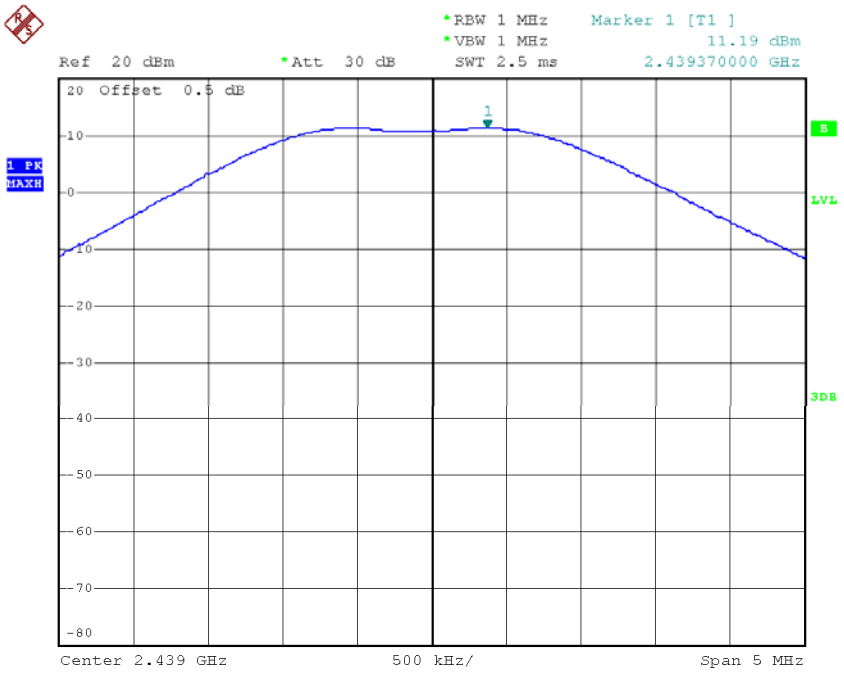
EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Voltage ：	DC 5V
Test Mode ：	CH01 / CH24 / CH49		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2403.585	11.07	21	0.125
2438.913	11.19	21	0.125
2477.313	10.79	21	0.125

2403.585MHz



2438.913MHz



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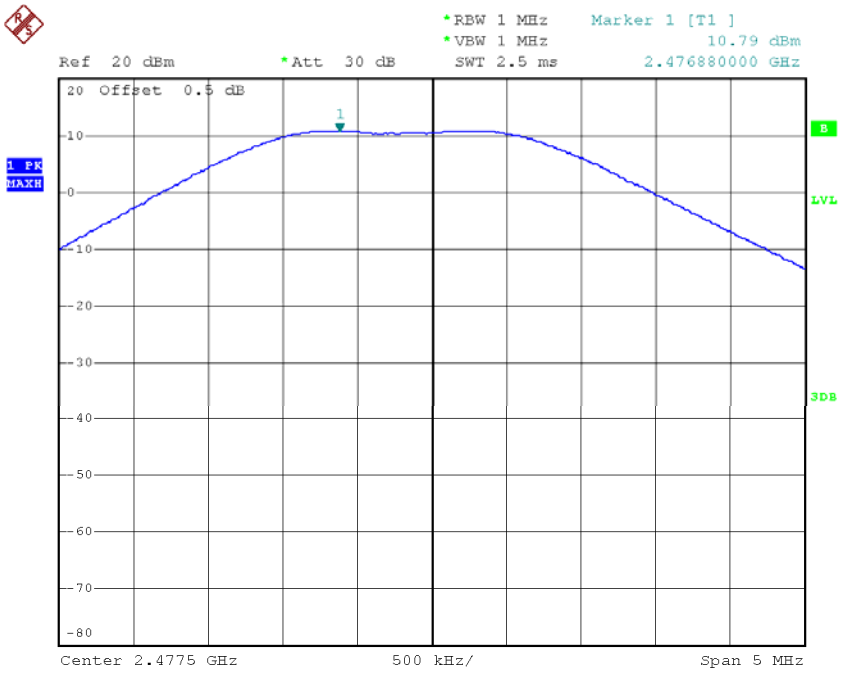
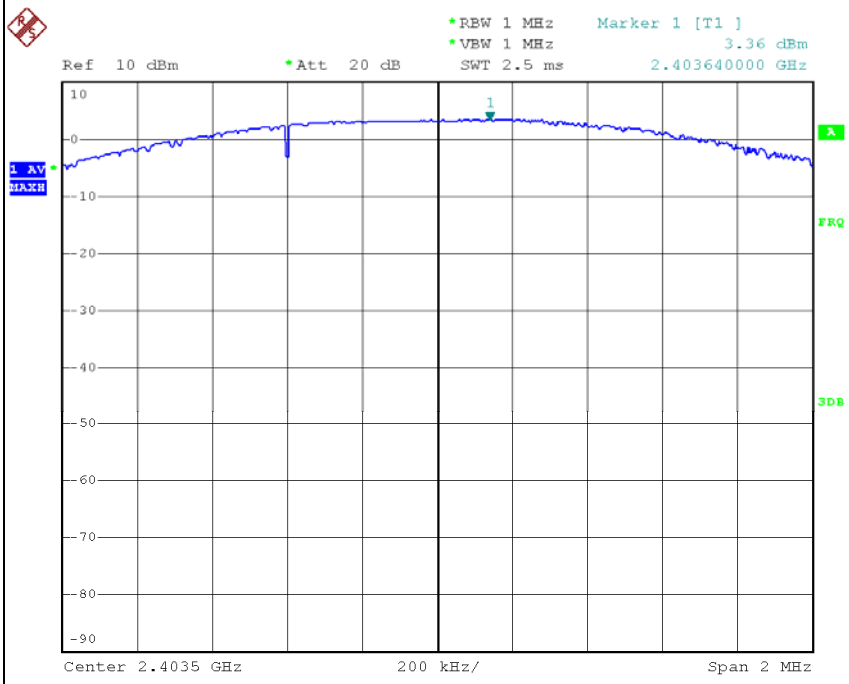
2477.313MHz



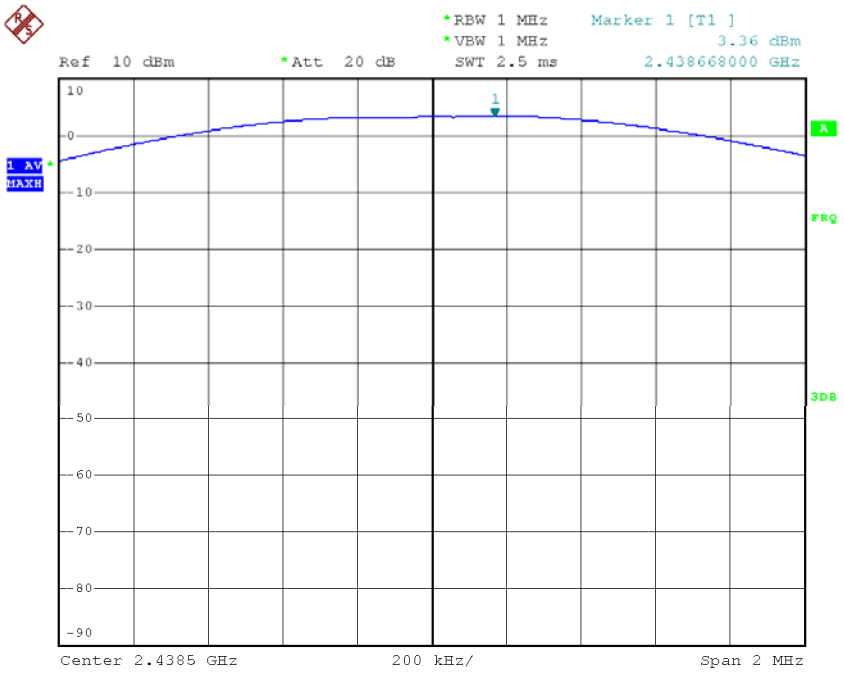
Date: 6.SEP.2013 12:10:20

Frequency (MHz)	AVG Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
2403.585	3.36	21	0.125
2438.913	3.36	21	0.125
2477.313	3.10	21	0.125

2403.585MHz

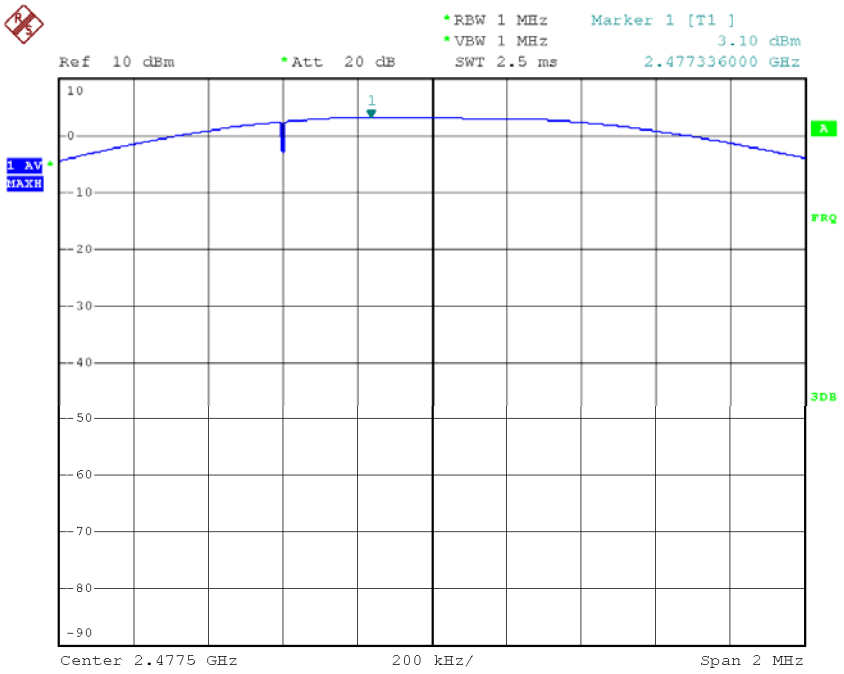


2438.913MHz



Date: 29.SEP.2013 10:21:18

2477.313MHz



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10. ANTENNA CONDUCTED SPURIOUS EMISSION

10.1 APPLIED PROCEDURES / LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of Equipment List is One Year.

10.1.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

10.1.3 DEVIATION FROM STANDARD

No deviation.

10.1.4 TEST SETUP

10.1.5 EUT OPERATION CONDITIONS

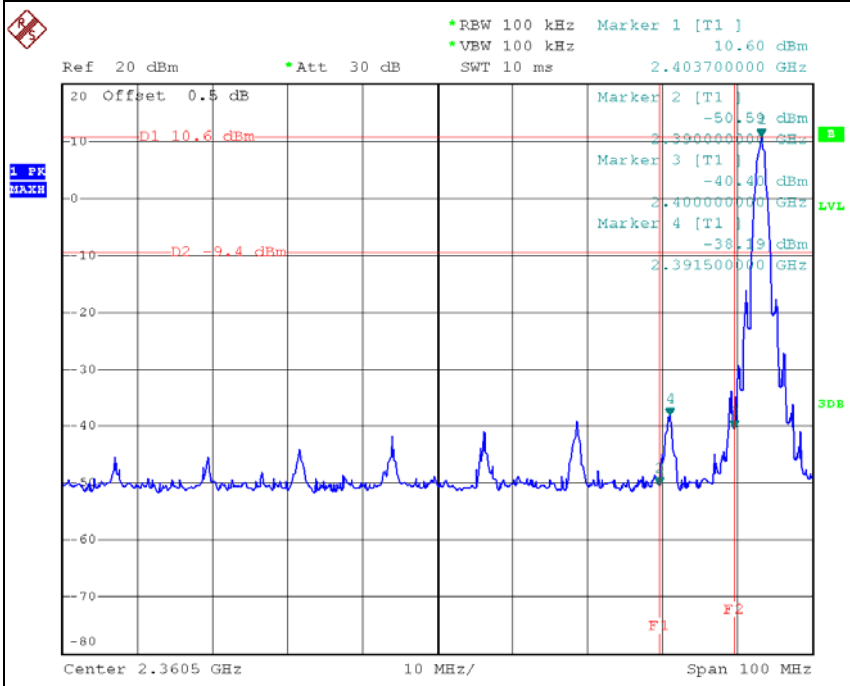
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

10.1.6 TEST RESULTS

EUT：	SKAA iPod Transmitter	Model Name ：	PL5557-S
Temperature：	25 ℃	Relative Humidity：	58 %
Pressure：	1009 hPa	Test Voltage ：	DC 5V
Test Mode ：	CH01 / CH24 / CH49 & Hopping on mode		

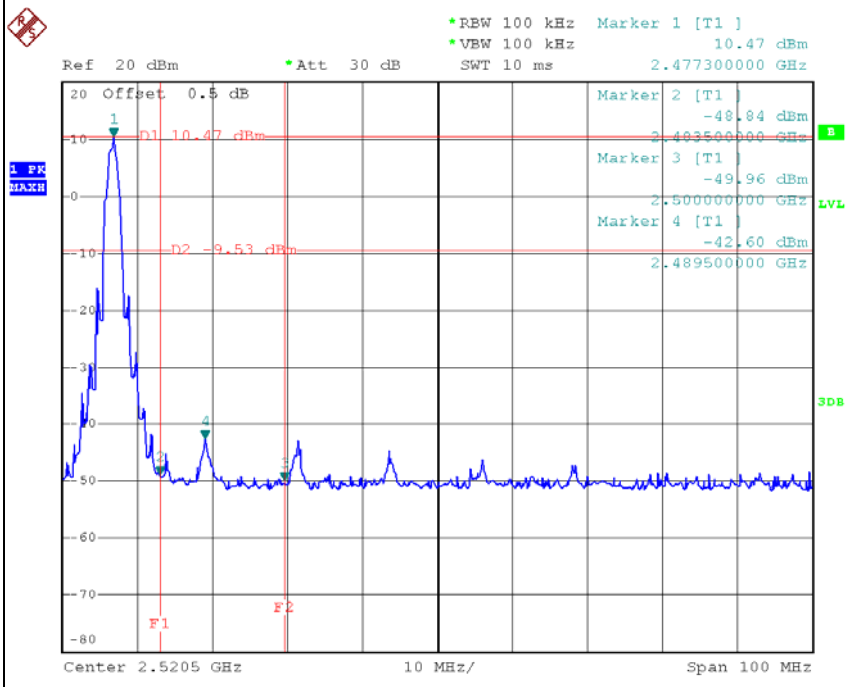
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2391.50	-38.19	2489.50	-42.60
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.			

2403.585MHz (Lower)



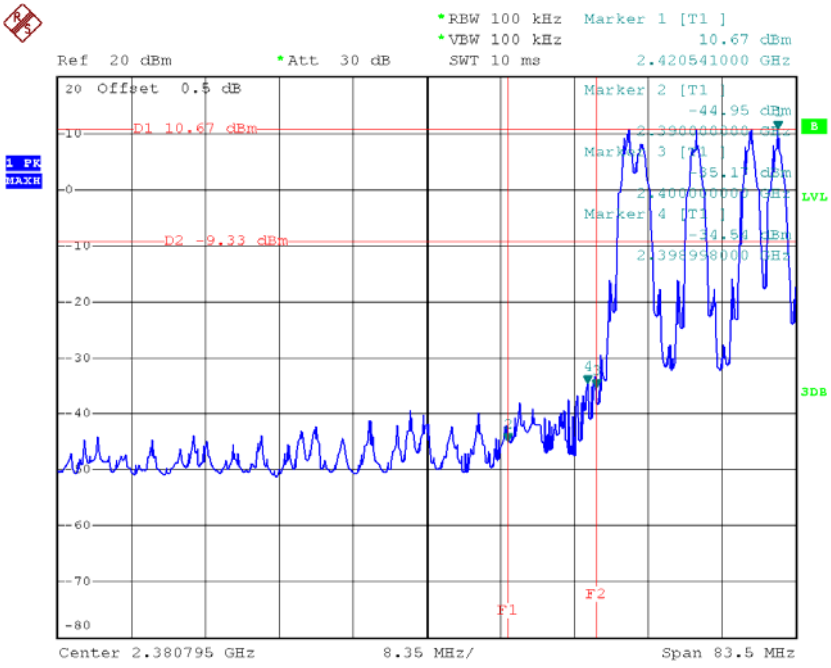
Date: 6.SEP.2013 12:03:40

2477.313MHz (upper)



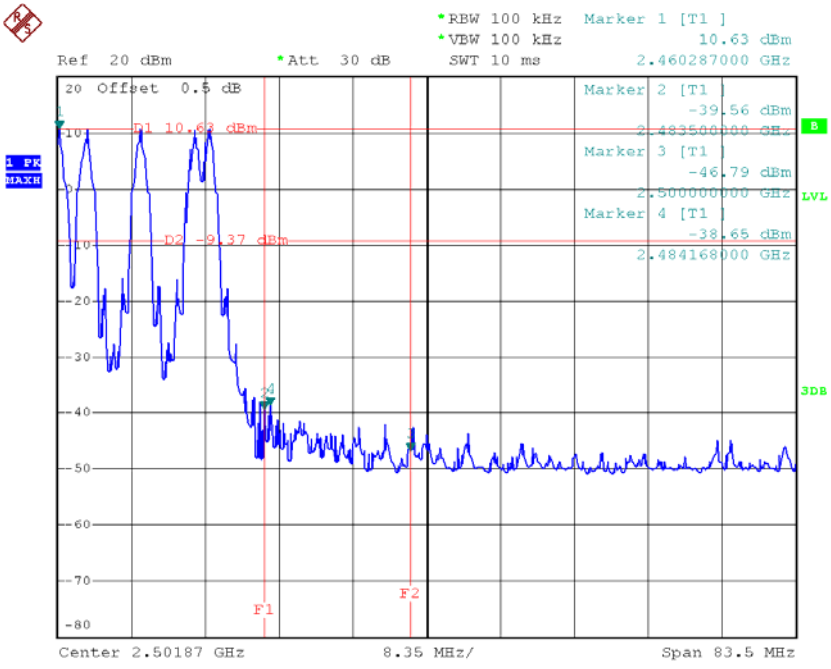
Date: 6.SEP.2013 12:10:55

Hopping on mode (Lower)



Date: 6.SEP.2013 12:15:19

Hopping on mode (upper)



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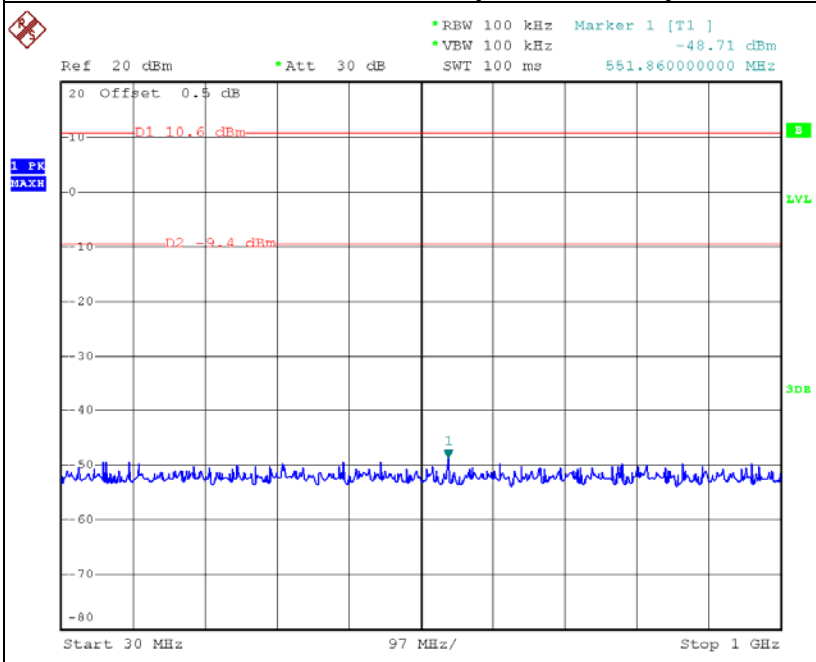
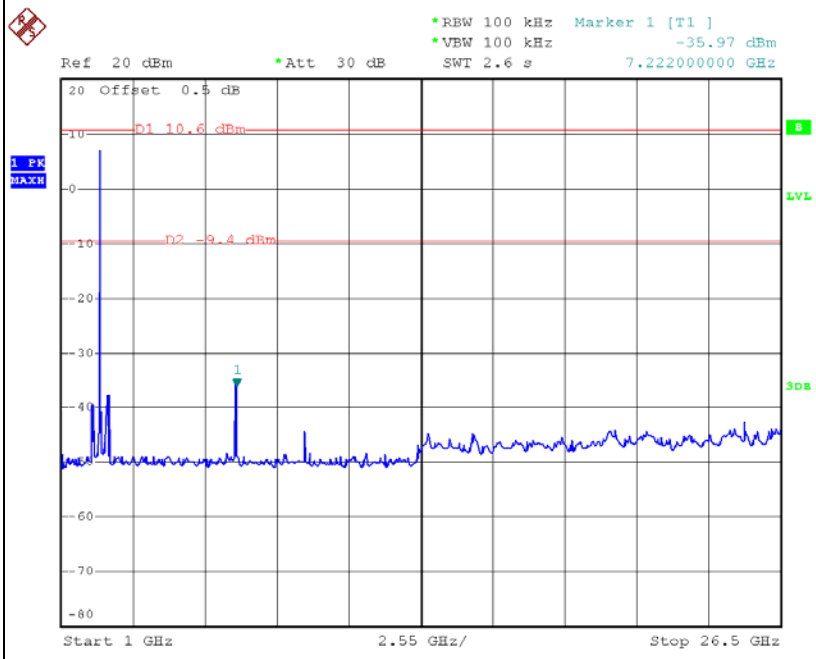
2403.585MHz (30MHz~1GHz)



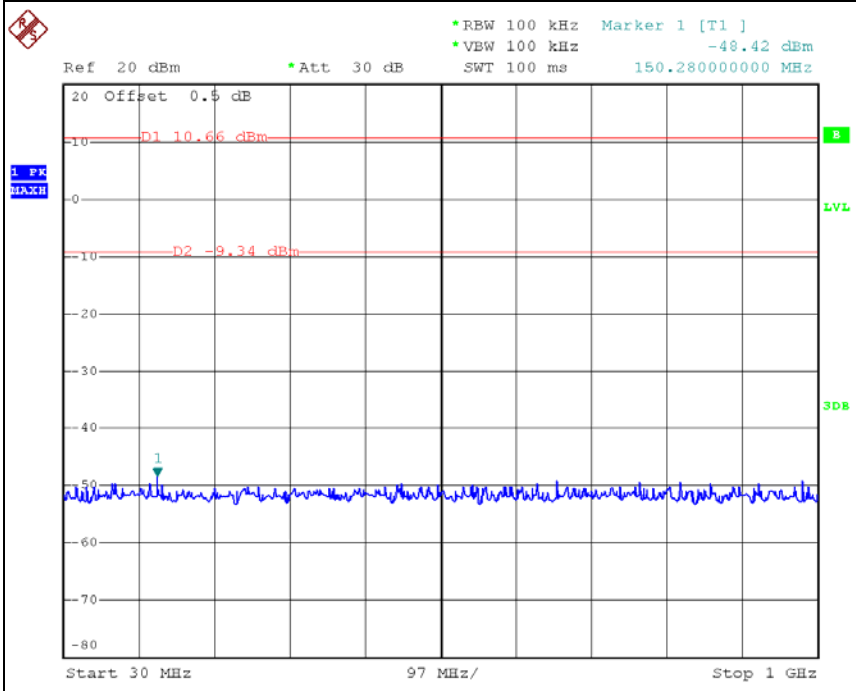
Date: 6.SEP.2013 12:03:56

2403.585MHz (1GHz～10th Harmonic)



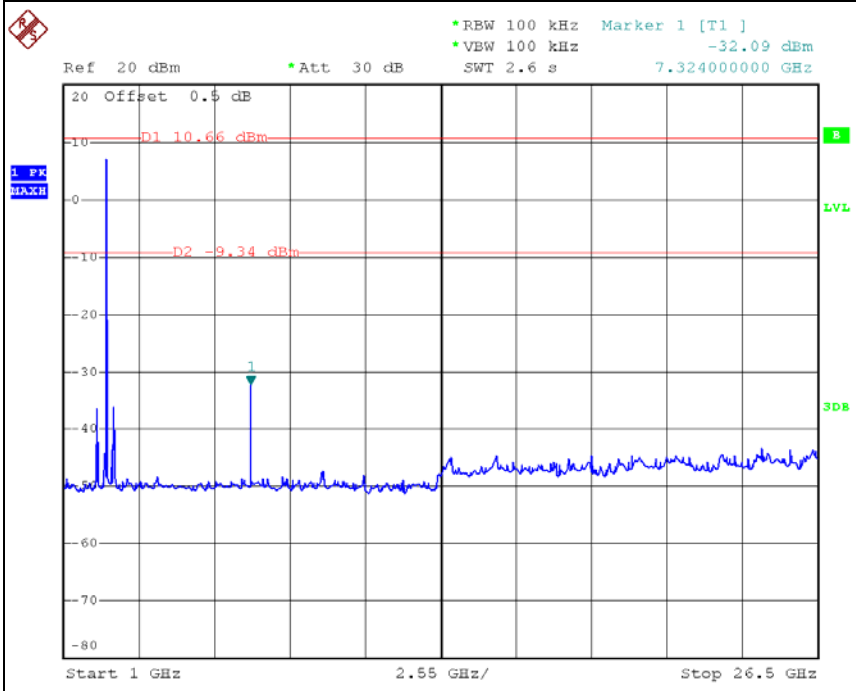
Date: 6.SEP.2013 12:04:17

2438.913MHz (30MHz~1GHz)



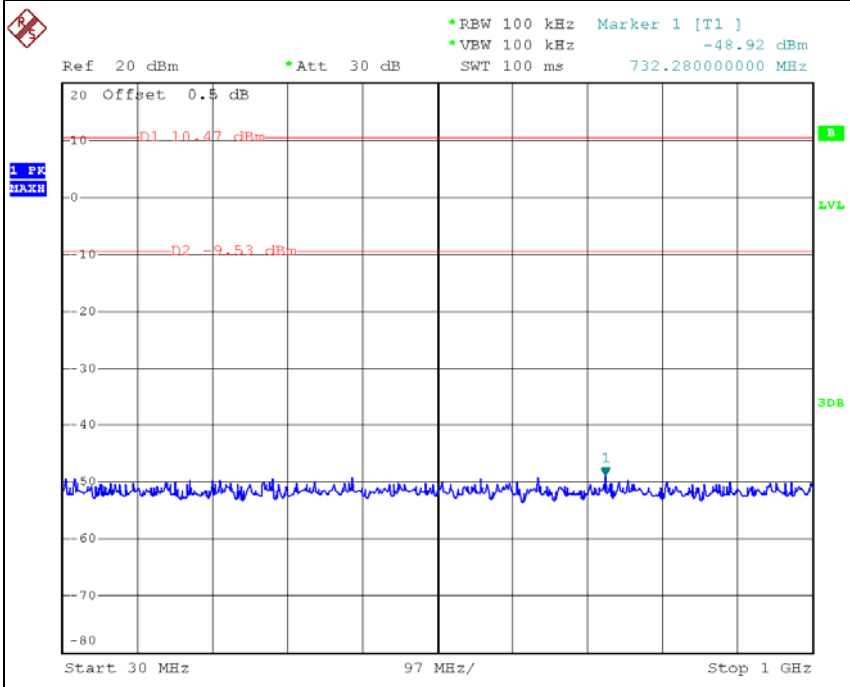
Date: 6.SEP.2013 12:07:10

2438.913MHz (1GHz～10th Harmonic)



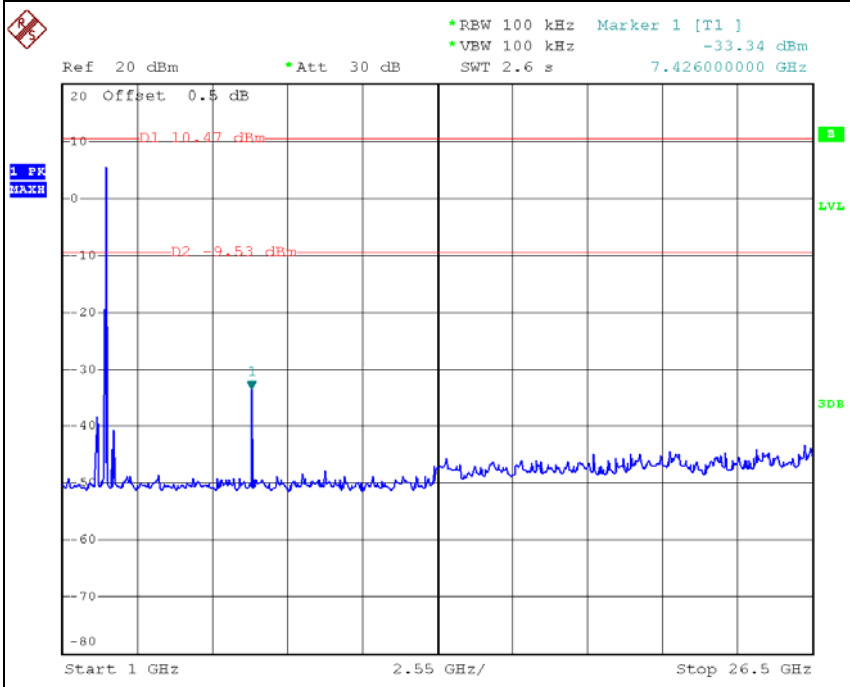
Date: 6.SEP.2013 12:07:31

2477.313MHz (30MHz~1GHz)



Date: 6.SEP.2013 12:11:04

2477.313MHz (1GHz～10th Harmonic)

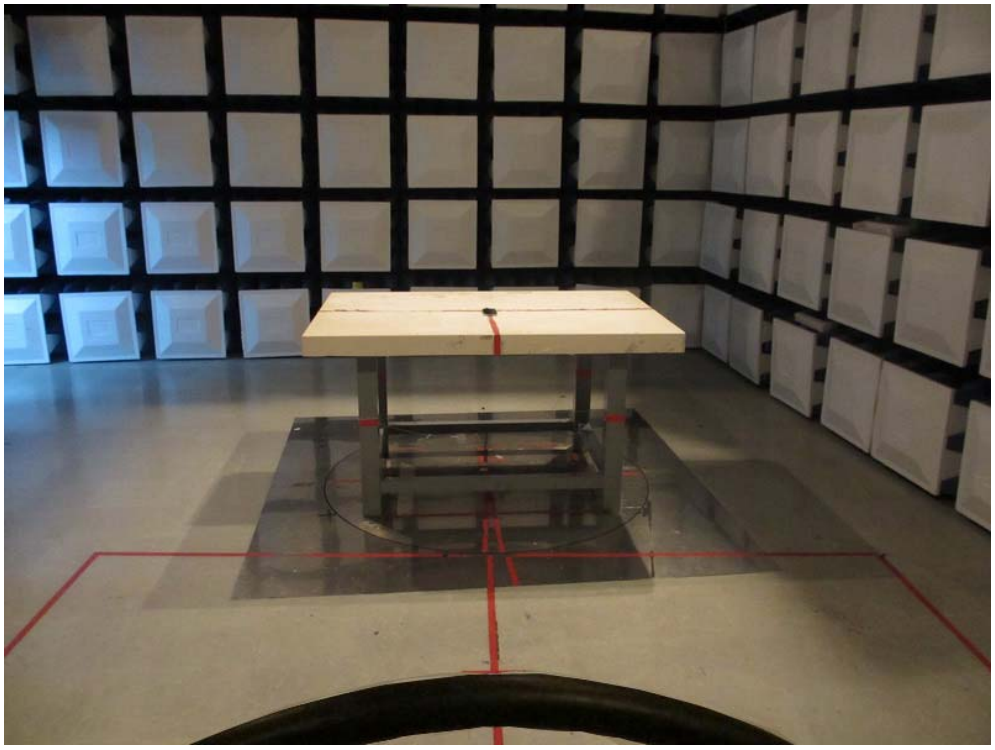


Date: 6.SEP.2013 12:11:17

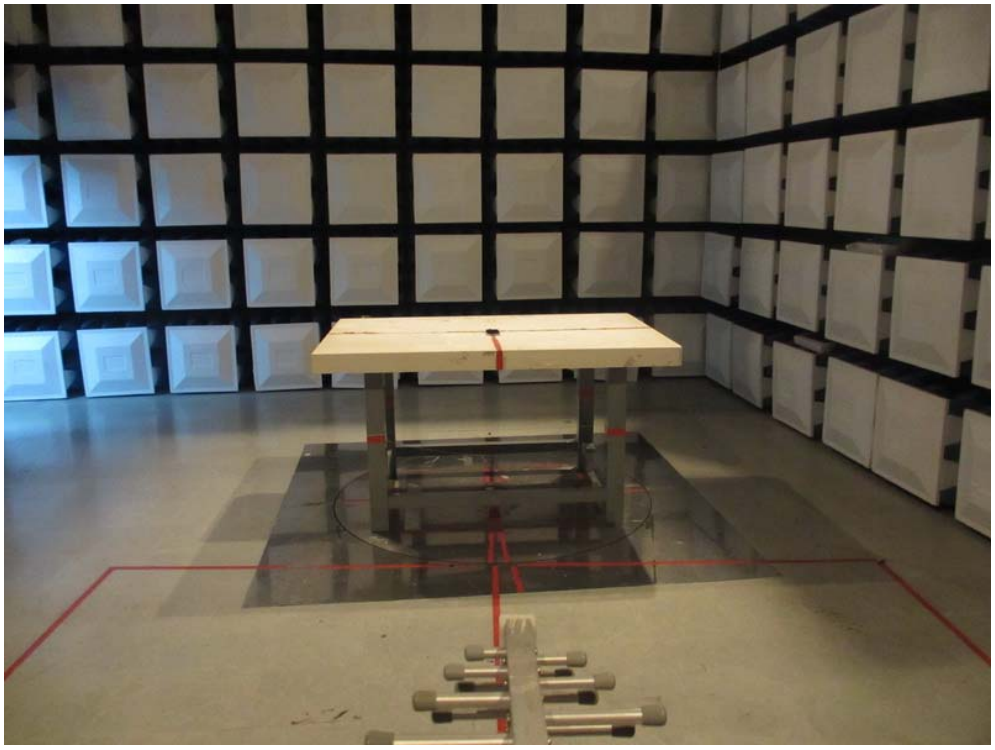
11. EUT PHOTOS

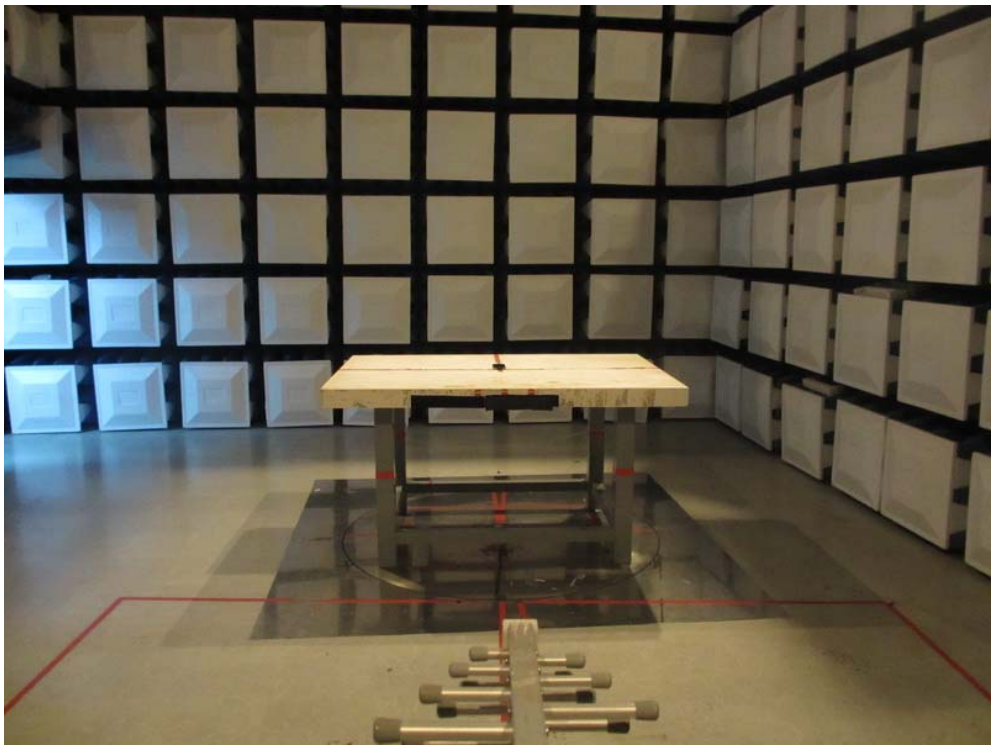
Conducted Measurement Photos

Radiated Measurement Photos
9K~30MHz



Radiated Measurement Photos
30~1000MHz





Radiated Measurement Photos
Above 1000MHz