



Neutron Engineering Inc.

FCC&IC Radio Test Report

FCC ID: OP5PL5564

IC: 3534A-PL5564

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

Issued Date : Sep. 18, 2013
Project No. : 1309C128
Equipment : SKAA Lightning connector Tx
Model Name : PL5564-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: Sep. 16, 2013

Date of Test: Sep. 16, 2013~ Sep. 17, 2013

Testing Engineer :

David Mao

(David Mao)

Technical Manager :

Leo Hung

(Leo Hung)

Authorized Signatory :

Steven Lu

(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.**

Neutron's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **Neutron** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **Neutron** issued reports.

Neutron's reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **Neutron-self**, extracts from the test report shall not be reproduced except in full with **Neutron's** authorized written approval.

Neutron's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

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
1 . CERTIFICATION	6
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	8
2.2 MEASUREMENT UNCERTAINTY	8
3 . GENERAL INFORMATION	9
3.1 GENERAL DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	11
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING	11
3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	12
3.5 DESCRIPTION OF SUPPORT UNITS	13
4 . EMC EMISSION TEST	14
4.1 CONDUCTED EMISSION MEASUREMENT	14
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	14
4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING	14
4.1.3 TEST PROCEDURE	15
4.1.4 DEVIATION FROM TEST STANDARD	15
4.1.5 TEST SETUP	15
4.1.6 EUT OPERATING CONDITIONS	15
4.1.7 TEST RESULTS	16
4.2 RADIATED EMISSION MEASUREMENT	17
4.2.1 RADIATED EMISSION LIMITS	17
4.2.2 MEASUREMENT INSTRUMENTS LIST ANS SETTING	18
4.2.3 TEST PROCEDURE	20
4.2.4 DEVIATION FROM TEST STANDARD	20
4.2.5 TEST SETUP	21
4.2.6 EUT OPERATING CONDITIONS	22
4.2.7 TEST RESULTS (BELOW 30MHZ)	23
4.2.8 TEST RESULTS (BETWEEN30 – 1000 MHZ)	24
4.2.9 TEST RESULTS (ABOVE 1000 MHZ)	31
5 . NUMBER OF HOPPING CHANNEL	43
5.1 APPLIED PROCEDURES / LIMIT	43
5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING	43
5.1.2 TEST PROCEDURE	43
5.1.3 DEVIATION FROM STANDARD	43
5.1.4 TEST SETUP	43
5.1.5 EUT OPERATION CONDITIONS	43
5.1.6 TEST RESULTS	44



Table of Contents	Page
6 . AVERAGE TIME OF OCCUPANCY	45
6.1 APPLIED PROCEDURES / LIMIT	45
6.1.1 MEASUREMENT INSTRUMENTS LIST	45
6.1.2 TEST PROCEDURE	45
6.1.3. TEST SETUP LAYOUT	45
6.1.4. TEST DEVIATION	45
6.1.5. EUT OPERATION DURING TEST	45
6.1.6. TEST RESULTS	46
7 . HOPPING CHANNEL SEPARATION MEASUREMENT	48
7.1 APPLIED PROCEDURES / LIMIT	48
7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING	48
7.1.2 TEST PROCEDURE	48
7.1.3 DEVIATION FROM STANDARD	48
7.1.4 TEST SETUP	48
7.1.5 EUT OPERATION CONDITIONS	48
7.1.6 TEST RESULTS	49
8 . BANDWIDTH TEST	51
8.1 APPLIED PROCEDURES / LIMIT	51
8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING	51
8.1.2 TEST PROCEDURE	51
8.1.3 DEVIATION FROM STANDARD	51
8.1.4 TEST SETUP	51
8.1.5 EUT OPERATION CONDITIONS	51
8.1.6 TEST RESULTS	52
9 . PEAK OUTPUT POWER TEST	54
9.1 APPLIED PROCEDURES / LIMIT	54
9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING	54
9.1.2 TEST PROCEDURE	54
9.1.3 DEVIATION FROM STANDARD	54
9.1.4 TEST SETUP	54
9.1.5 EUT OPERATION CONDITIONS	54
9.1.6 TEST RESULTS	55
10 . ANTENNA CONDUCTED SPURIOUS EMISSION	57
10.1 APPLIED PROCEDURES / LIMIT	57
10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING	57
10.1.2 TEST PROCEDURE	57
10.1.3 DEVIATION FROM STANDARD	57
10.1.4 TEST SETUP	57
10.1.5 EUT OPERATION CONDITIONS	57
10.1.6 TEST RESULTS	58



Table of Contents

Page

11 . EUT PHOTOS

64



1. CERTIFICATION

Equipment : SKAA Lightning connector Tx
Brand Name : SKAA; Diz
Model Name : PL5564-S
Applicant : Eleven Engineering Inc.
Manufacturer : AML Industrial Electronic Ltd.
Address : 15/F., Block B, Veristrong Industrial Centre 34-36 Au Pui Wan Street Fotan,
Shatin, N.T. HONG KONG
Factory : AML Industrial Electronic Ltd.
Address : Po Shan Industrial Estate, Zhangmutou Town, Dongguan City, Guangdong,
CHINA, 523622
Date of Test : Sep. 16, 2013~ Sep. 17, 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-1-1309C128) 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	N/A	Note(1)
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-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 $y \pm U$, where expanded 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	9KHz~30MHz	V	3.79	
		9KHz~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

Equipment	SKAA Lightning connector Tx	
Brand Name	SKAA; Diz	
Model Name	PL5564-S	
Model Difference	N/A	
Product Description	Operation Frequency:	2403.585~2477.313 MHz
	Modulation Technology:	FHSS (FSK)
	Bit Rate of Transmitter:	2.048Mbps
	Number Of Channel	49 CH, Please see note 2. (Page 10)
	Antenna Designation:	Please see note 3. (Page 10)
	Antenna Gain(Peak)	
	Output Power:	10.88 dBm (Max)
	More details of EUT technical specification, please refer to the User's Manual.	
Power Source	Supplied from host system.	
Power Rating	DC 5V	
Connecting I/O Port(s)	Please refer to the User's Manual	

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		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	N/A	-3.57



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

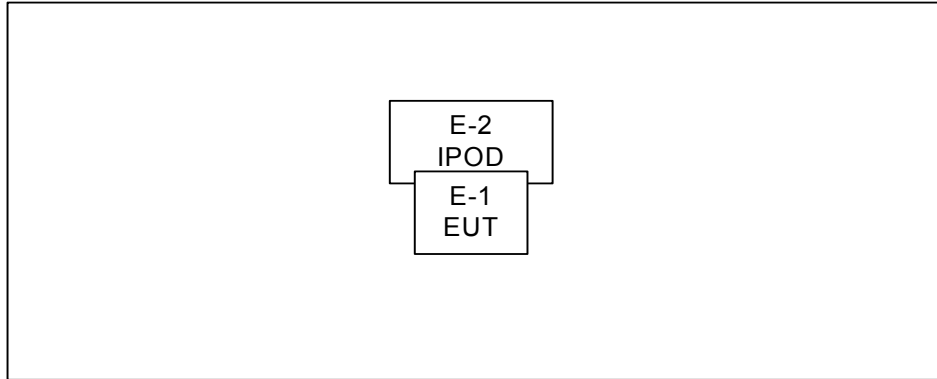
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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





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 Lightning connector Tx	N/A	PL5564-S	OP5PL5564 / 3534A-PL5564	N/A	EUT
E-2	IPOD	Apple	A1509	DOC	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

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

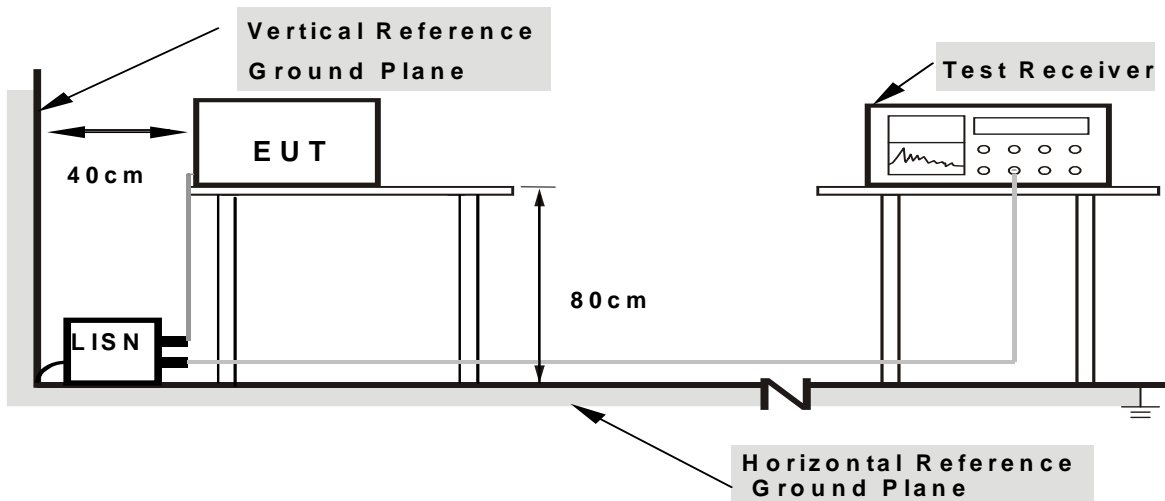
4.1.3 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- 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 cm 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/Receiver data or Hopping on mode.



4.1.7 TEST RESULTS

EUT:	SKAA Lightning connector Tx	Model Name:	PL5564-S
Temperature:	-	Relative Humidity:	-
Test Power:	-	Phase:	-
Test Mode:	N/A		

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.



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	Jul. 02, 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



Neutron Engineering Inc.

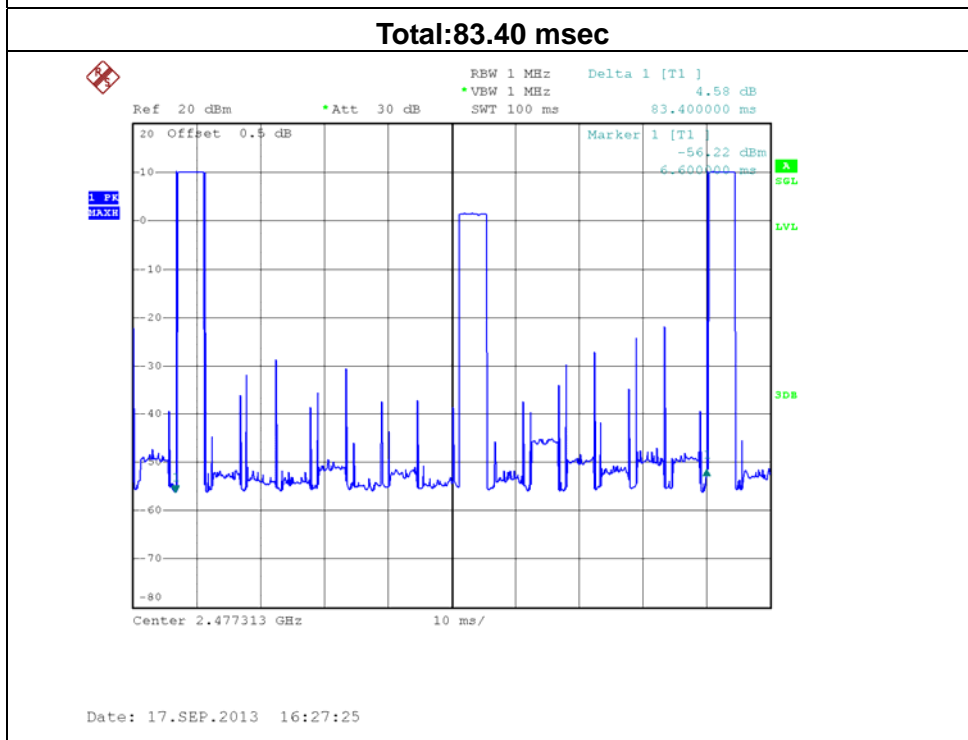
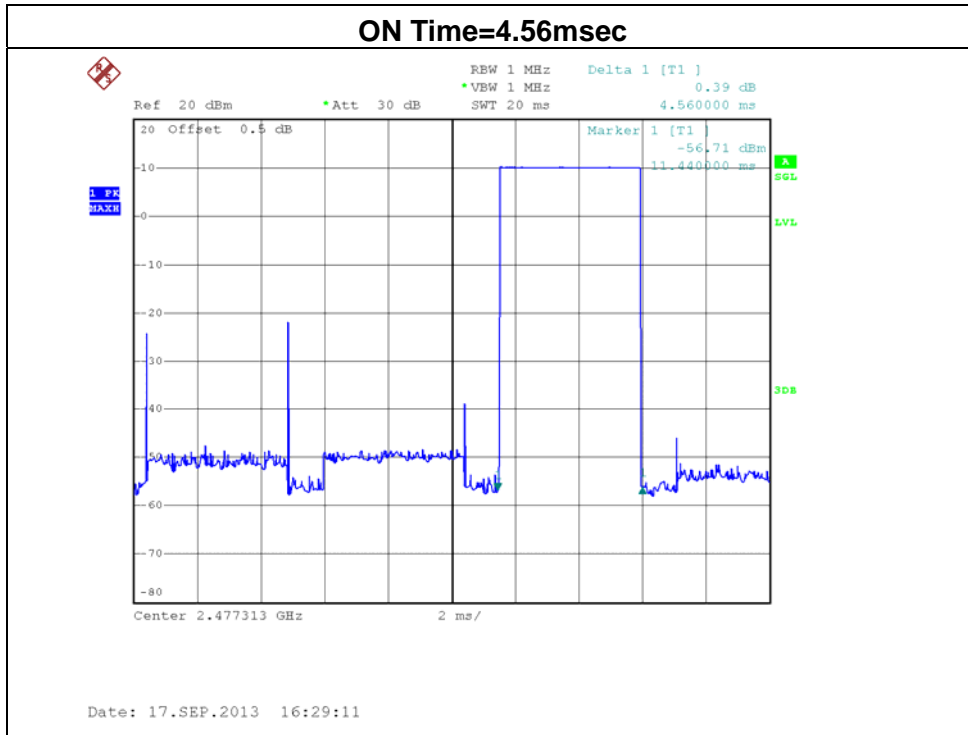
Channel: TX 2477.313MHz

Duty Cycle= $T_{ON}/(T_{ON} + T_{OFF})$

Duty Cycle=4.56/83.4

Average = Peak value +20log (Duty cycle)

Final AV=PK-25.24





4.2.3 TEST PROCEDURE

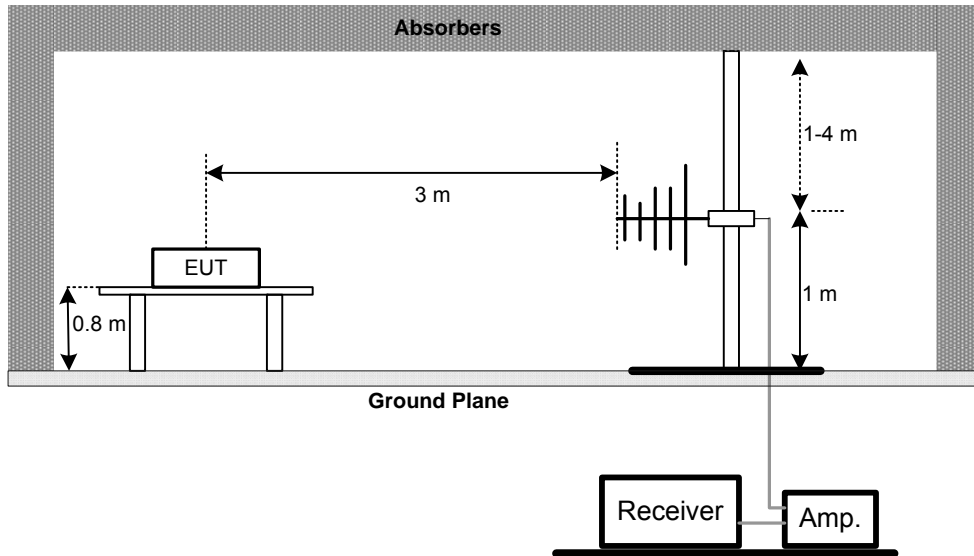
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 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

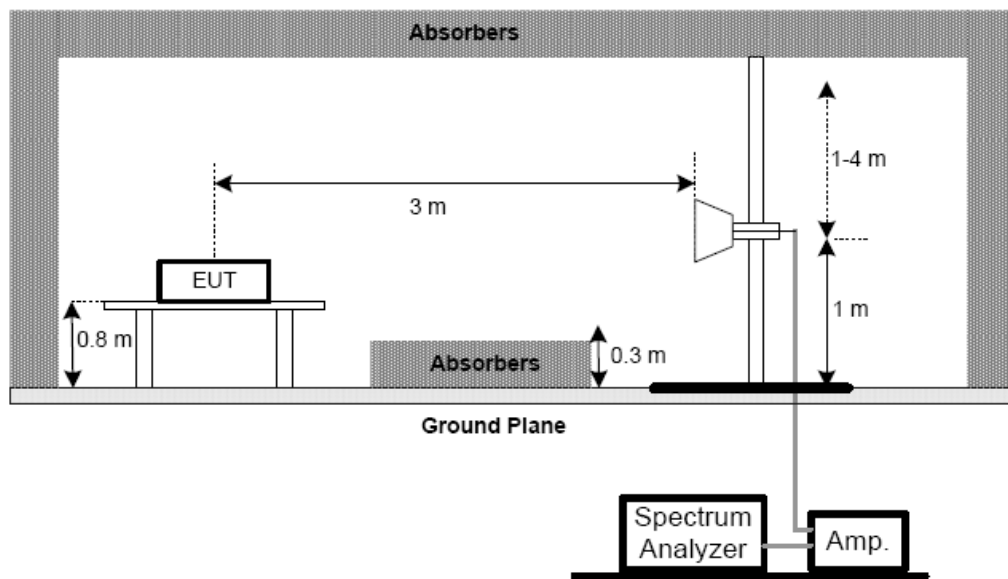
No deviation

4.2.5 TEST SETUP

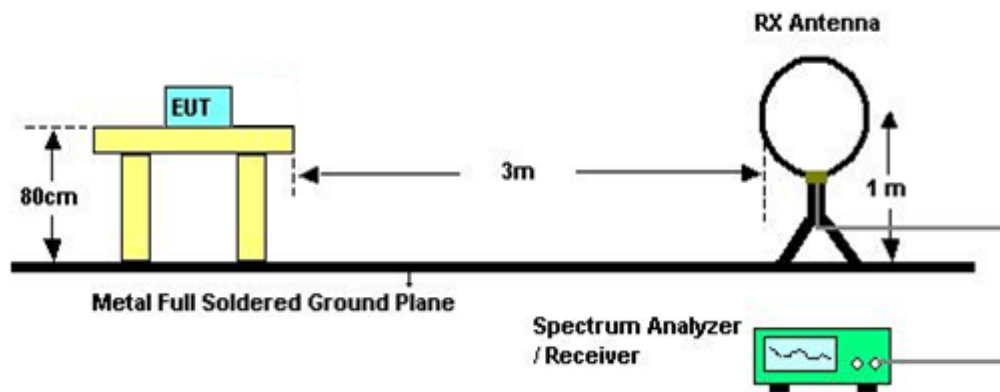
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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 Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	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
0.0075	0°	25.59	24.30	49.89	130.10	-80.21	AVG
0.0075	0°	29.57	24.30	53.87	150.10	-96.23	PK
0.0255	0°	21.64	23.95	45.59	119.46	-73.87	AVG
0.0255	0°	24.31	23.95	48.26	139.46	-91.20	PK
0.0388	0°	21.51	23.11	44.62	115.84	-71.22	AVG
0.0388	0°	24.38	23.11	47.49	135.84	-88.35	PK
0.0635	0°	18.73	22.13	40.86	111.55	-70.69	AVG
0.0635	0°	23.92	22.13	46.05	131.55	-85.50	PK
0.2672	0°	20.63	20.36	40.99	99.07	-58.08	AVG
0.2672	0°	22.88	20.36	43.24	119.07	-75.83	PK
1.4736	0°	27.12	19.55	46.67	64.24	-17.56	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0097	90°	19.42	24.30	43.72	127.85	-84.13	AVG
0.0097	90°	20.28	24.30	44.58	147.85	-103.27	PK
0.0223	90°	15.54	24.15	39.69	120.63	-80.94	AVG
0.0223	90°	17.42	24.15	41.57	140.63	-99.06	PK
0.0462	90°	18.95	22.64	41.59	114.32	-72.72	AVG
0.0462	90°	21.27	22.64	43.91	134.32	-90.40	PK
0.0773	90°	21.11	21.85	42.96	109.84	-66.88	AVG
0.0773	90°	22.27	21.85	44.12	129.84	-85.72	PK
0.3758	90°	21.38	20.10	41.48	96.10	-54.63	AVG
0.3758	90°	24.55	20.10	44.65	116.10	-71.46	PK
1.7162	90°	25.95	19.53	45.48	69.54	-24.06	QP

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below 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. ◦



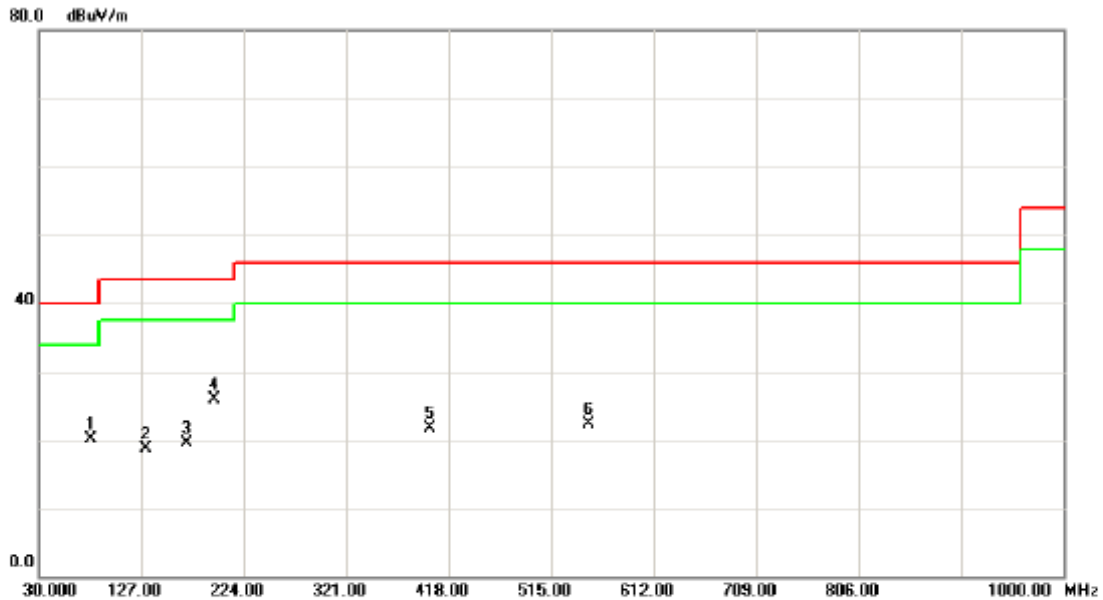
4.2.8 TEST RESULTS (BETWEEN 30 – 1000 MHZ)

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.



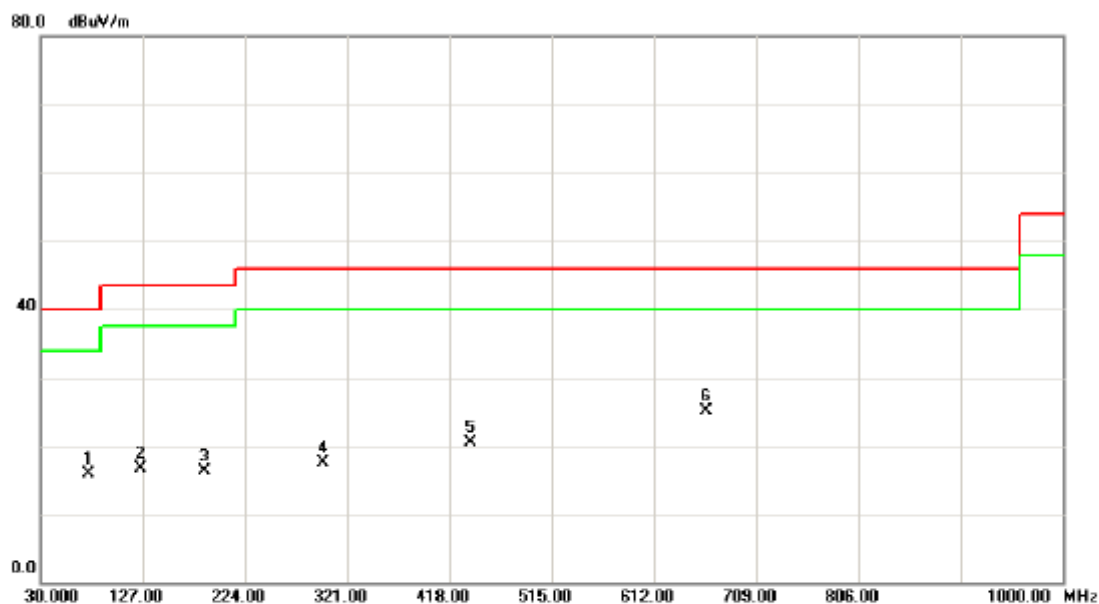
EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode 2403.585MHz	Polarization:	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		79.4700	37.59	-17.43	20.16	40.00	-19.84	peak	
2		130.8800	32.00	-13.37	18.63	43.50	-24.87	peak	
3		169.6800	32.32	-12.76	19.56	43.50	-23.94	peak	
4	*	195.8700	40.76	-14.84	25.92	43.50	-17.58	peak	
5		400.5400	31.48	-9.87	21.61	46.00	-24.39	peak	
6		549.9200	29.91	-7.65	22.26	46.00	-23.74	peak	



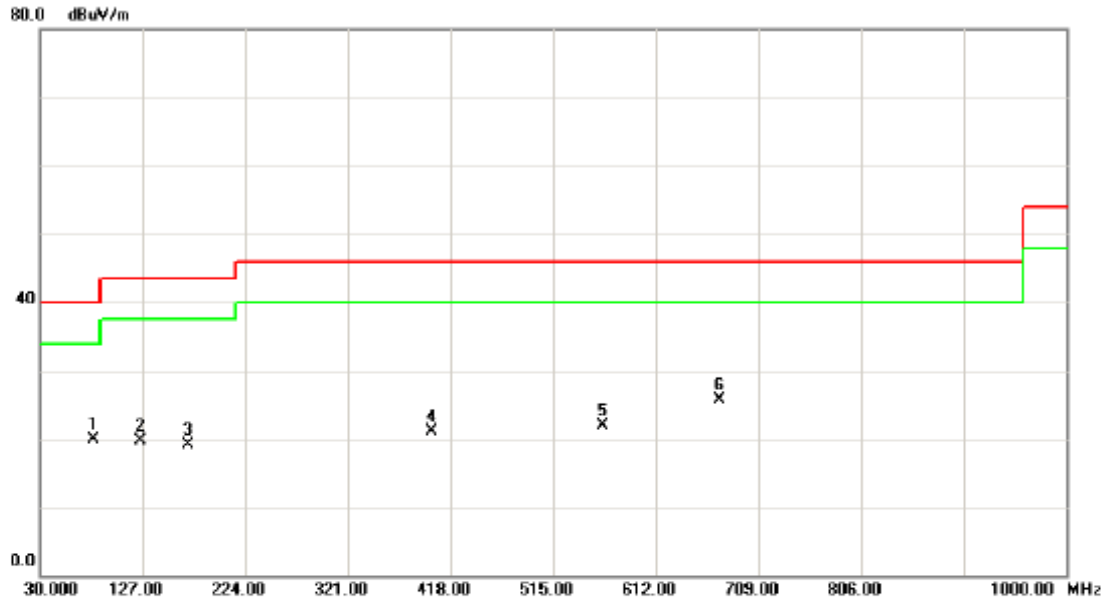
EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode 2403.585MHz	Polarization:	Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		75.5900	32.67	-16.85	15.82	40.00	-24.18	peak	
2		125.0600	30.33	-13.61	16.72	43.50	-26.78	peak	
3		185.2000	29.91	-13.60	16.31	43.50	-27.19	peak	
4		298.6900	28.83	-11.33	17.50	46.00	-28.50	peak	
5		438.3700	29.74	-9.14	20.60	46.00	-25.40	peak	
6	*	661.4700	30.43	-5.40	25.03	46.00	-20.97	peak	



EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode 2438.913MHz	Polarization:	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	80.4400	37.37	-17.55	19.82	40.00	-20.18	peak	
2		125.0600	33.26	-13.61	19.65	43.50	-23.85	peak	
3		169.6800	31.77	-12.76	19.01	43.50	-24.49	peak	
4		400.5400	30.88	-9.87	21.01	46.00	-24.99	peak	
5		561.5600	29.62	-7.76	21.86	46.00	-24.14	peak	
6		672.1400	30.86	-5.23	25.63	46.00	-20.37	peak	



Neutron Engineering Inc.

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode 2438.913MHz	Polarization:	Horizontal



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	76.5600	32.59	-16.99	15.60	40.00	-24.40	peak	
2	177.4400	30.52	-12.81	17.71	43.50	-25.79	peak	
3	285.1100	30.16	-12.16	18.00	46.00	-28.00	peak	
4	459.7100	29.94	-9.19	20.75	46.00	-25.25	peak	
5	557.6800	29.51	-7.72	21.79	46.00	-24.21	peak	
6 *	679.9000	29.89	-5.11	24.78	46.00	-21.22	peak	



Neutron Engineering Inc.

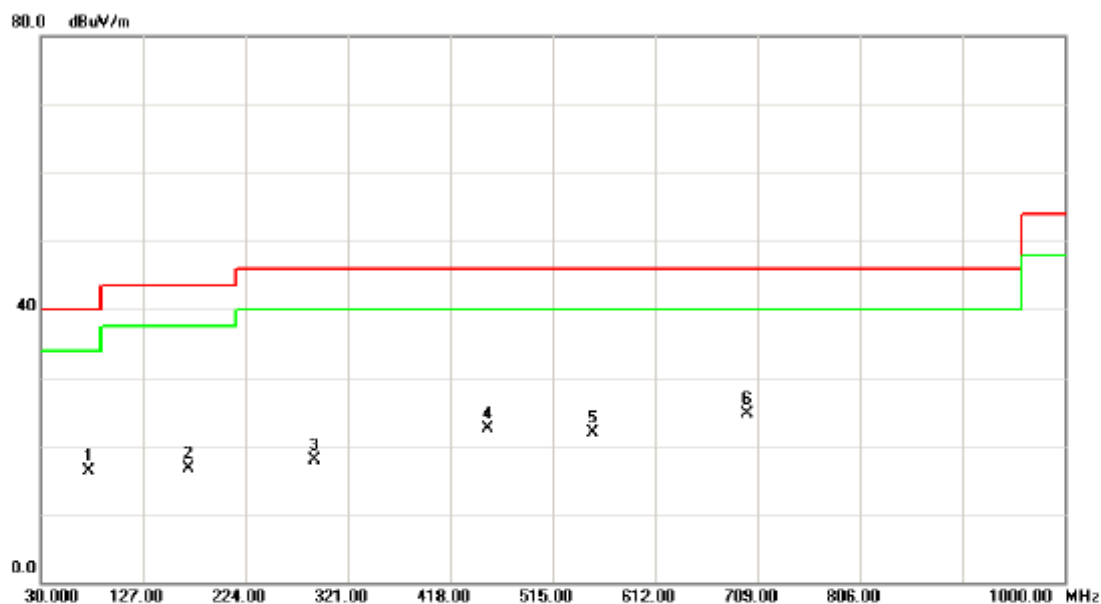
EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode 2477.313MHz	Polarization:	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	*	78.5000	37.36	-17.29	20.07	40.00	-19.93	peak	
2		125.0600	32.60	-13.61	18.99	43.50	-24.51	peak	
3		169.6800	32.10	-12.76	19.34	43.50	-24.16	peak	
4		400.5400	31.12	-9.87	21.25	46.00	-24.75	peak	
5		562.5300	29.89	-7.76	22.13	46.00	-23.87	peak	
6		647.8900	30.23	-5.67	24.56	46.00	-21.44	peak	



EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX Mode 2477.313MHz	Polarization:	Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		75.5900	33.15	-16.85	16.30	40.00	-23.70	peak	
2		169.6800	29.39	-12.76	16.63	43.50	-26.87	peak	
3		288.9900	29.87	-11.89	17.98	46.00	-28.02	peak	
4		452.9200	31.41	-8.99	22.42	46.00	-23.58	peak	
5		552.8300	29.58	-7.67	21.91	46.00	-24.09	peak	
6	*	699.3000	29.54	-4.82	24.72	46.00	-21.28	peak	



4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX 2403.585MHz		

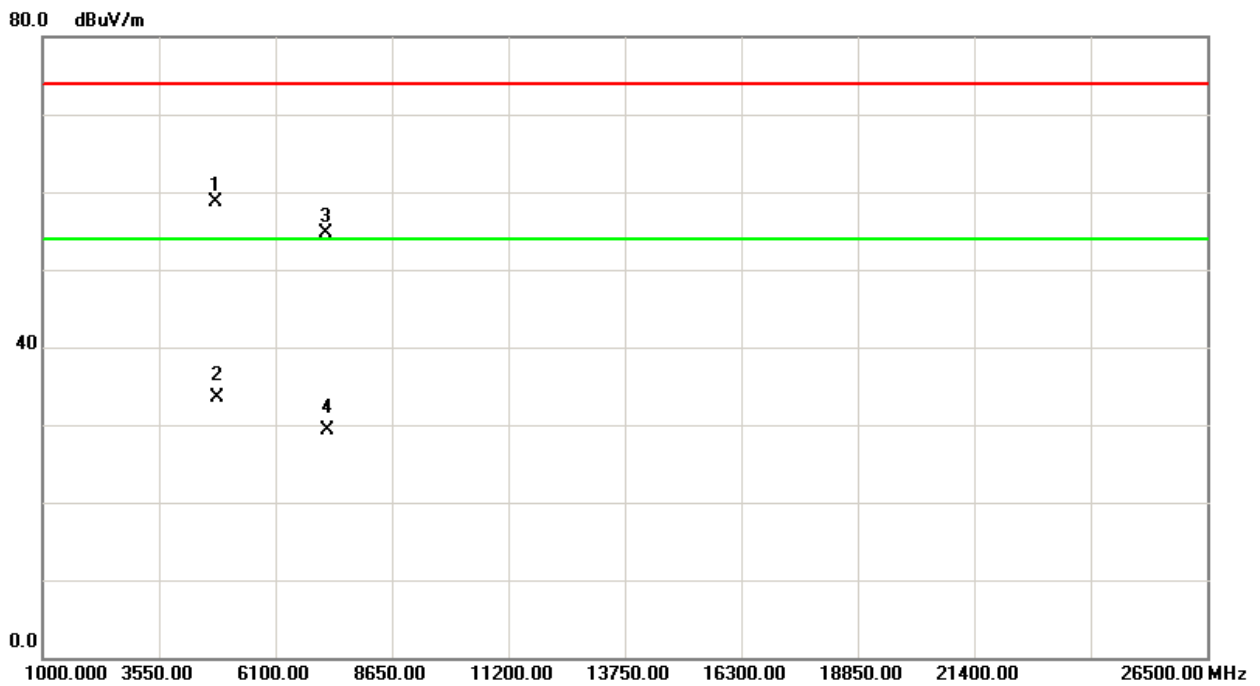
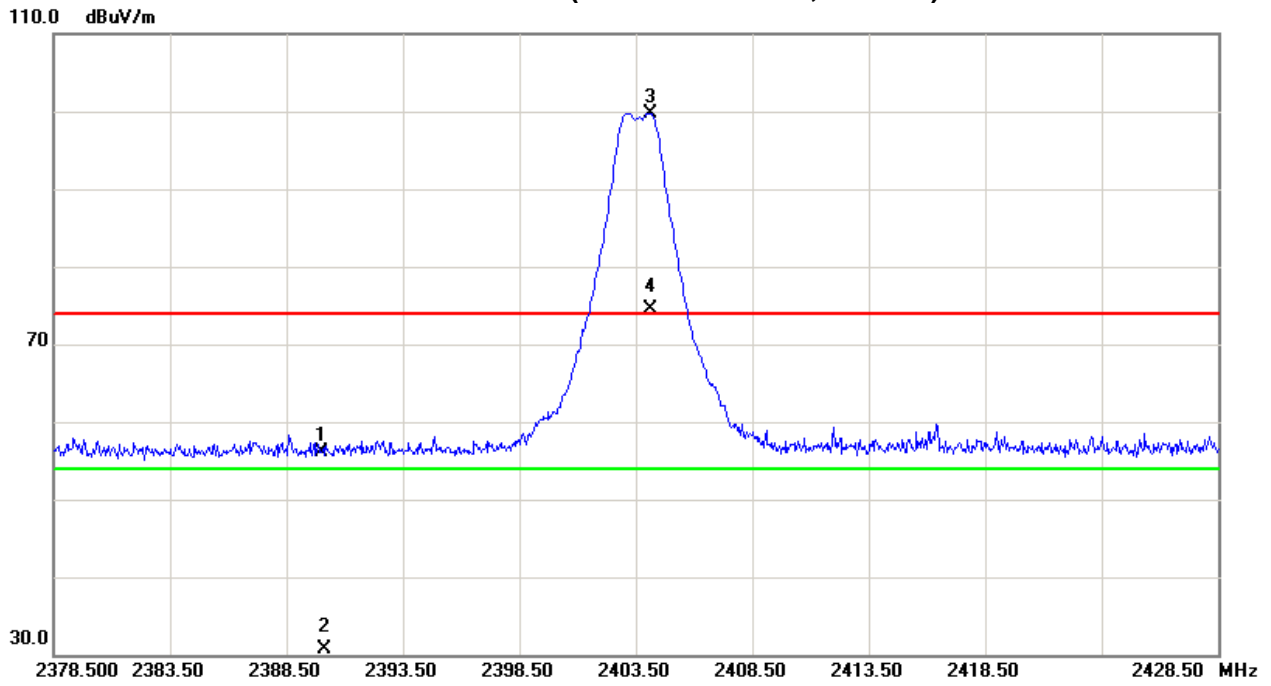
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	V	21.95	-3.29	34.09	56.04	30.80	74.00	54.00	-17.96	-23.20	X/E
2404.10	V	65.64	40.40	34.14	99.78	74.54					X/F
4806.29	V	52.27	27.03	6.38	58.65	33.41	74.00	54.00	-15.35	-20.59	X/H
7212.15	V	42.71	17.47	11.93	54.64	29.40	74.00	54.00	-19.36	-24.60	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 Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX 2403.585MHz		

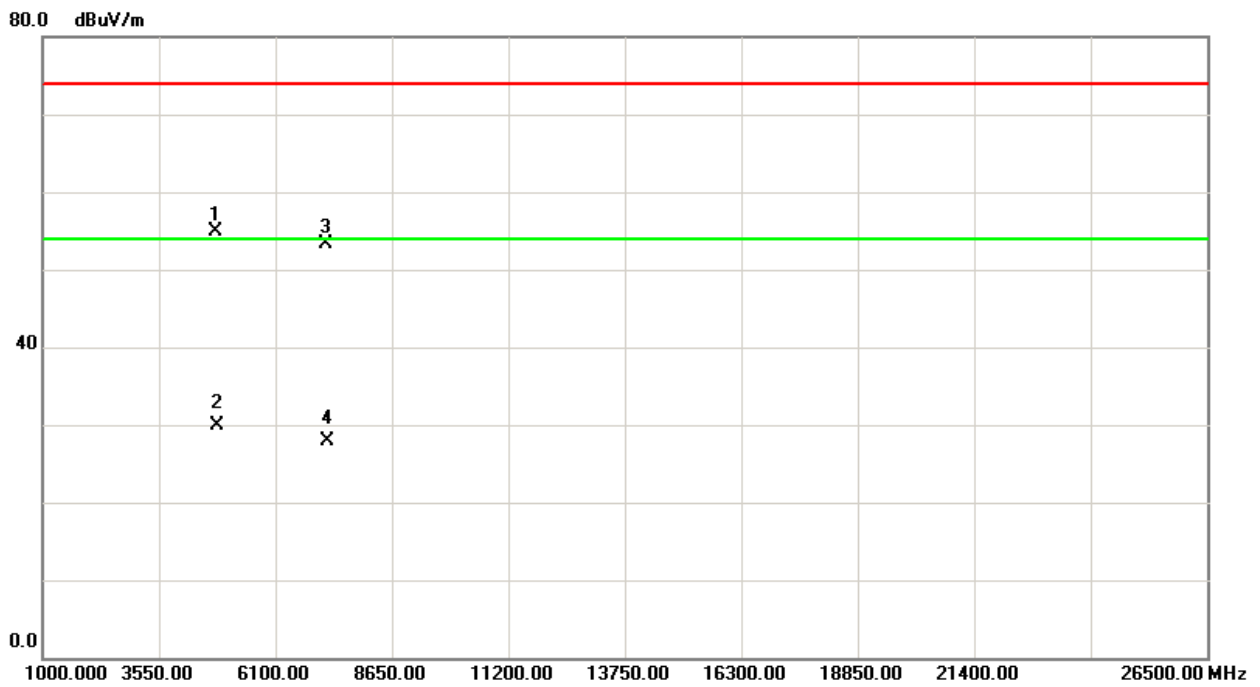
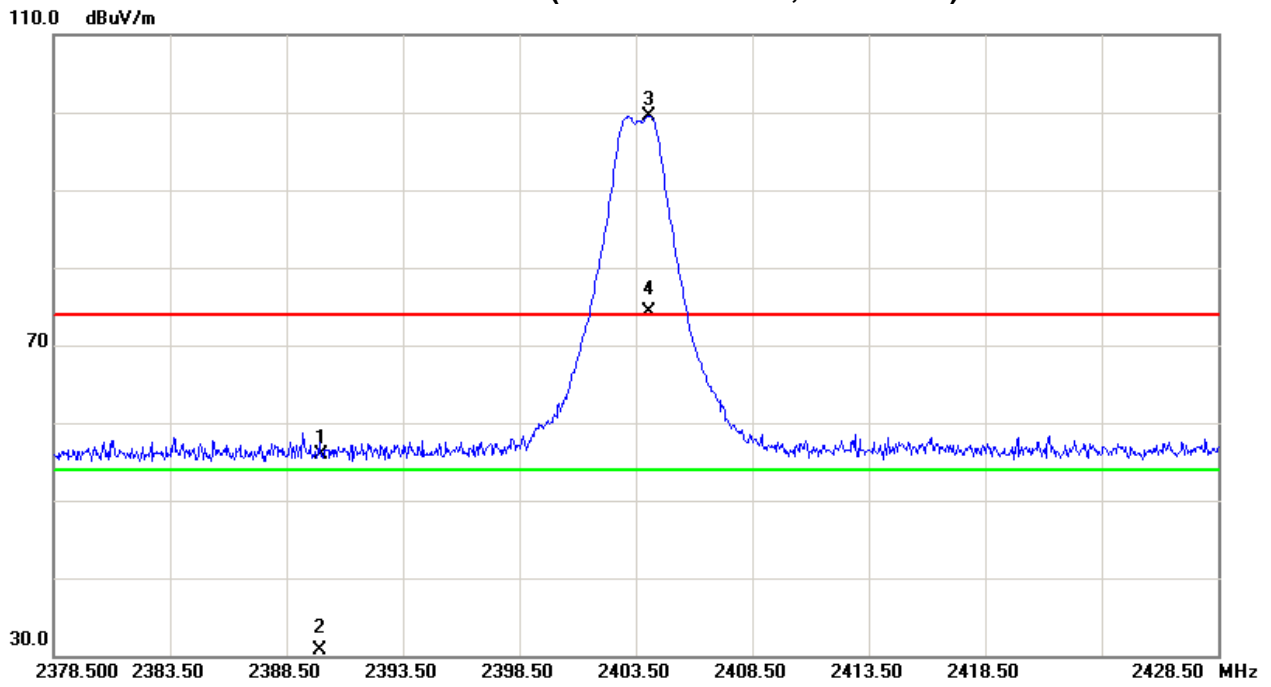
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2390.00	H	21.76	-3.48	34.09	55.85	30.61	74.00	54.00	-18.15	-23.39	X/E
2404.05	H	65.33	40.09	34.14	99.47	74.23					X/F
4806.33	H	48.59	23.53	6.38	54.97	29.91	74.00	54.00	-19.03	-24.09	X/H
7210.11	H	41.29	16.05	11.92	53.21	27.97	74.00	54.00	-20.79	-26.03	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 Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX 2438.913MHz		

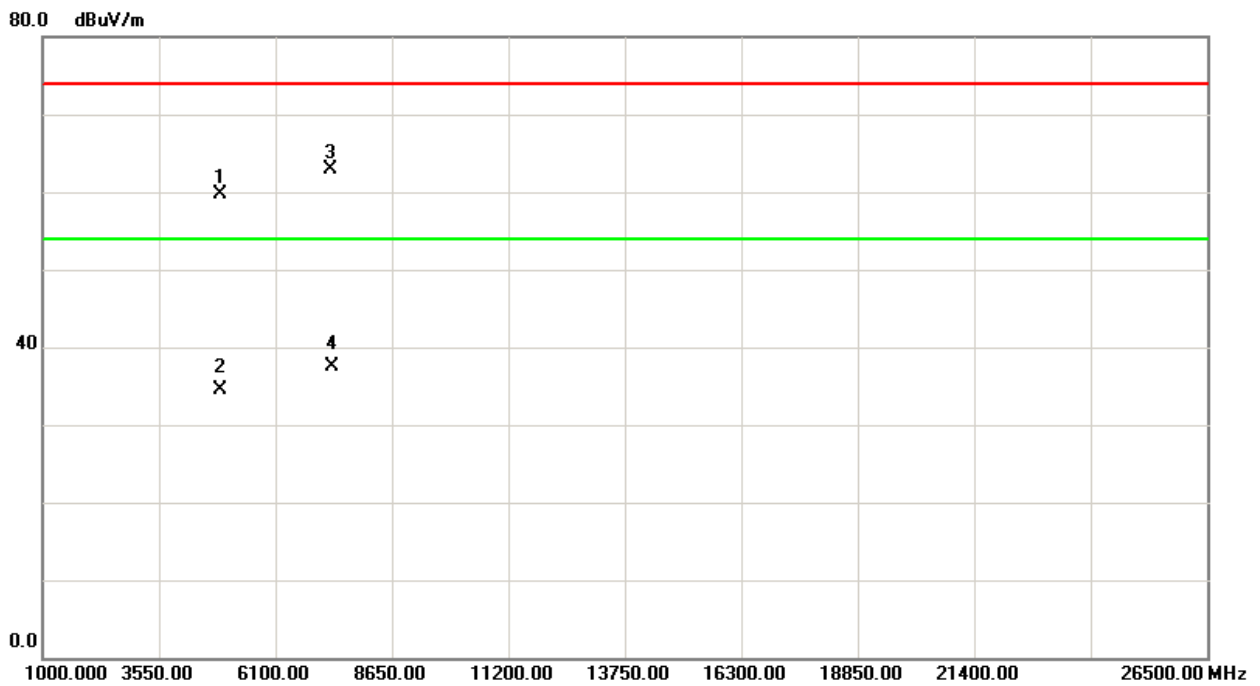
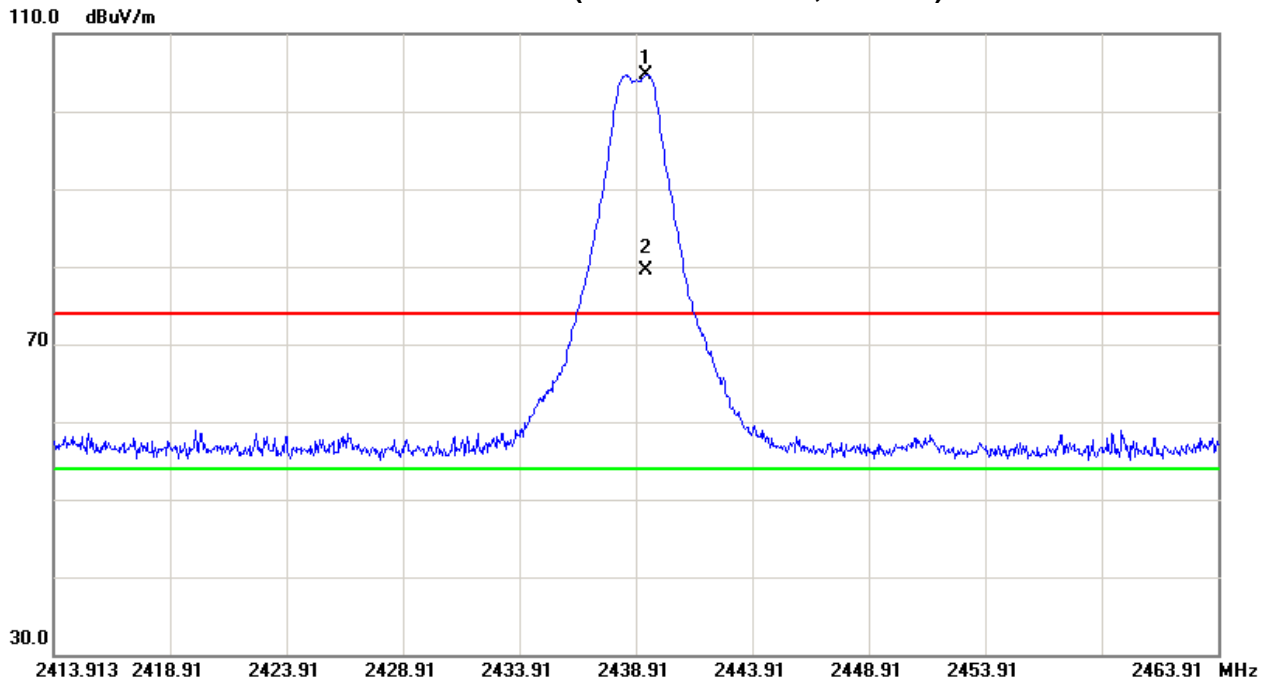
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV dBuV/m	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2439.36	V	70.44	45.20	34.24	104.68	79.44					X/F
4877.03	V	53.18	27.94	6.60	59.78	34.54	74.00	54.00	-14.22	-19.46	X/H
7315.39	V	50.69	25.45	12.15	62.84	37.60	74.00	54.00	-11.16	-16.40	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 Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX 2438.913MHz		

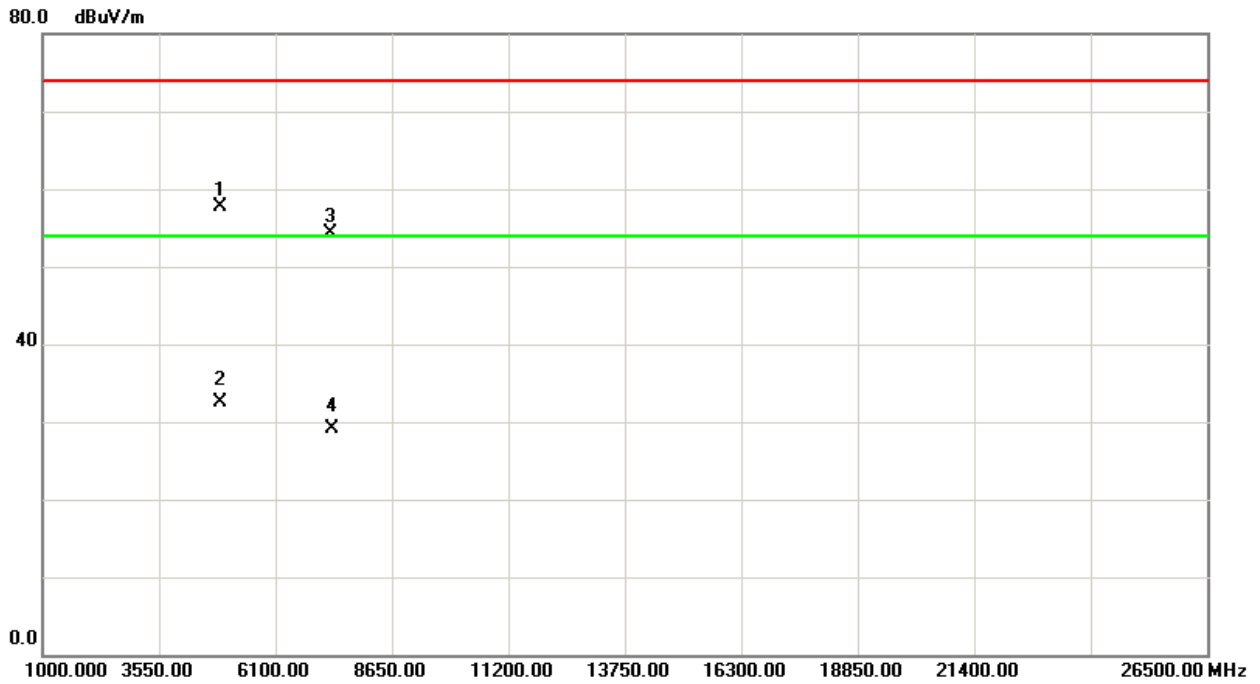
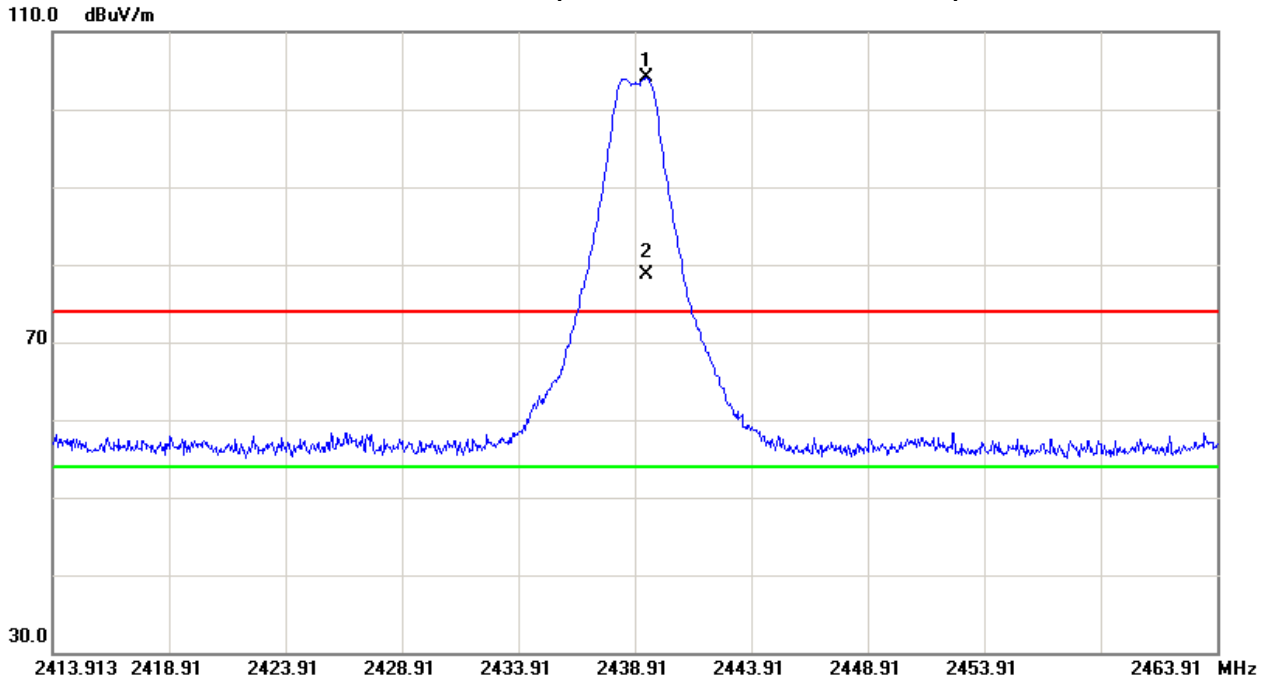
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2439.41	H	69.78	44.54	34.24	104.02	78.78					X/F
4876.81	H	51.18	25.94	6.60	57.78	32.54	74.00	54.00	-16.22	-21.46	X/H
7315.25	H	42.20	16.96	12.15	54.35	29.11	74.00	54.00	-19.65	-24.89	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 Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX 2477.313MHz		

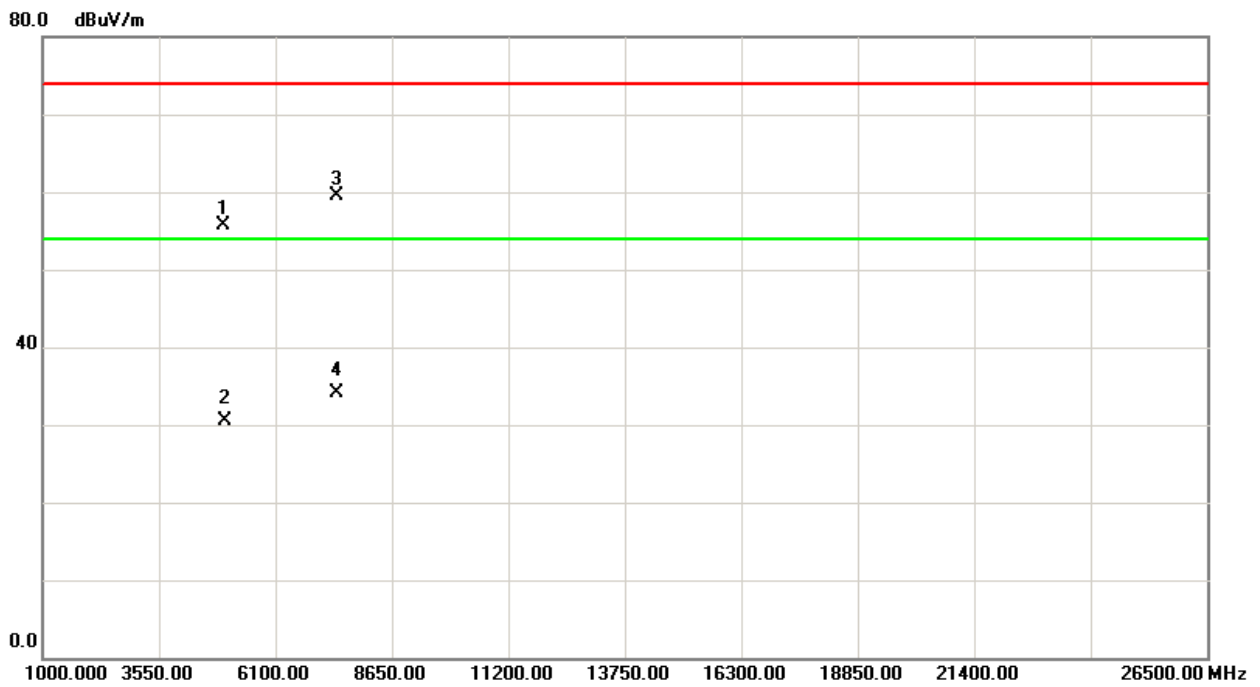
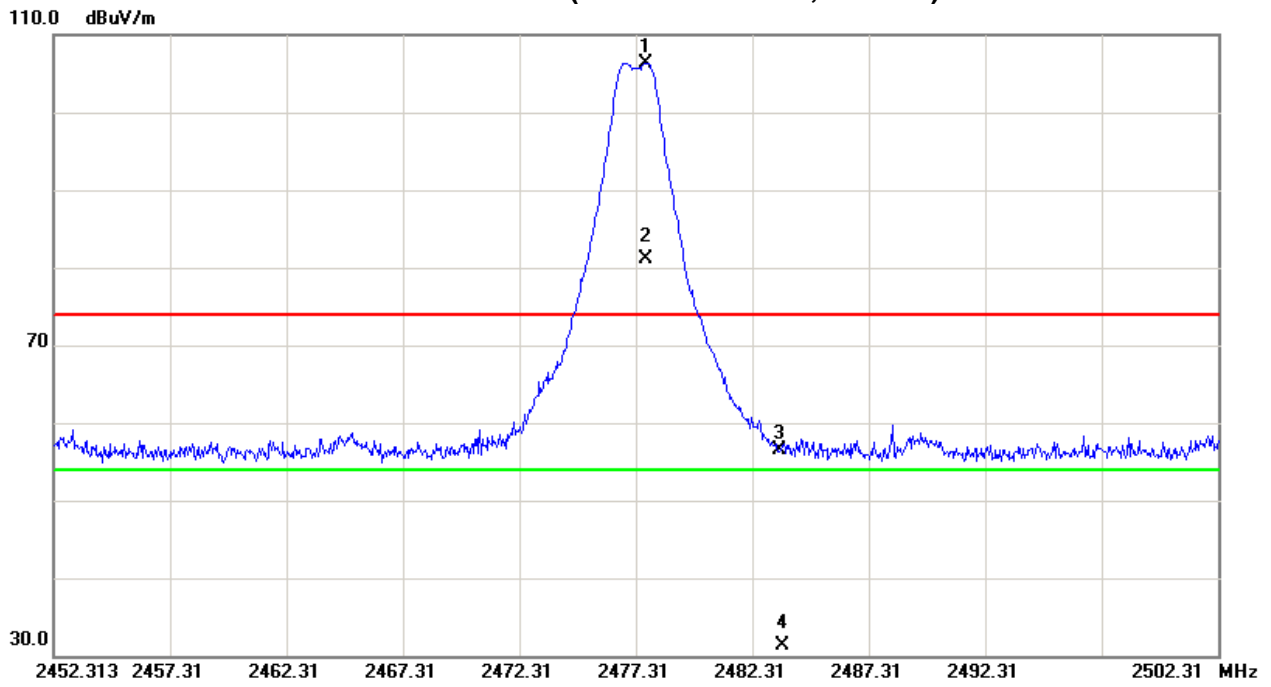
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2477.76	V	72.00	46.76	34.35	106.35	81.11					X/F
2483.50	V	22.12	-3.12	34.37	56.49	31.25	74.00	54.00	-17.51	-22.75	X/E
4953.82	V	48.85	23.61	6.82	55.67	30.43	74.00	54.00	-18.33	-23.57	X/H
7433.06	V	47.03	21.79	12.39	59.42	34.18	74.00	54.00	-14.58	-19.82	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 Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	TX 2477.313MHz		

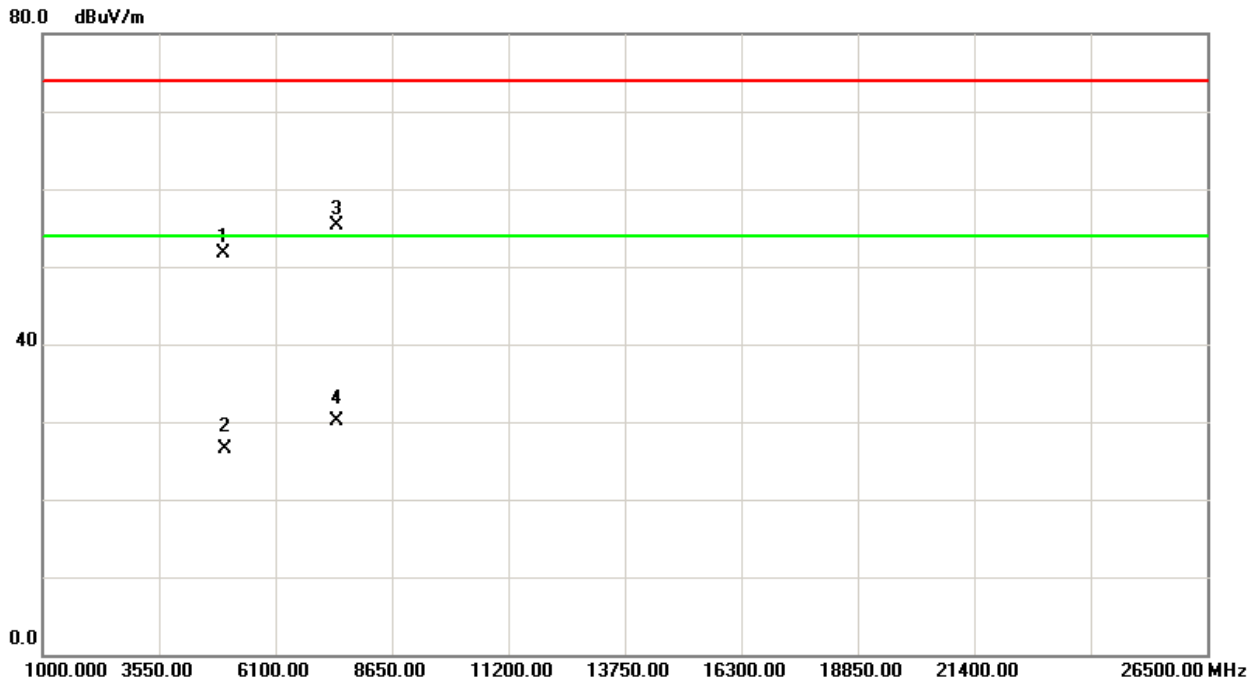
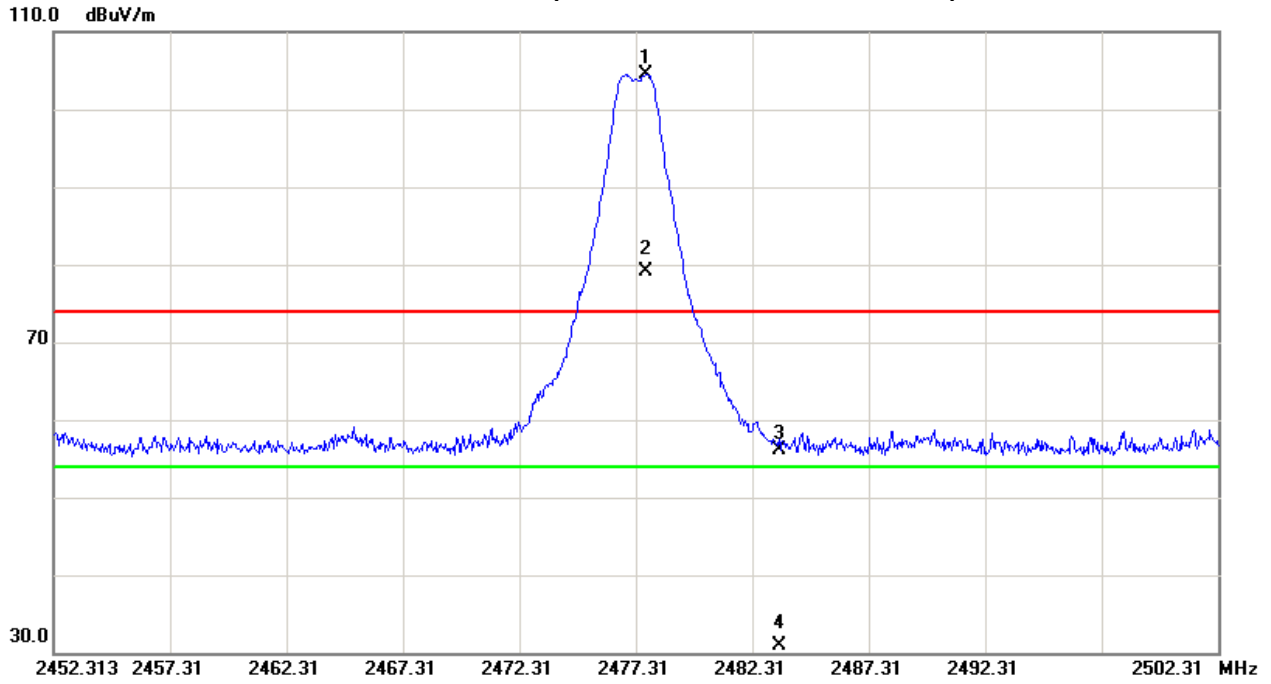
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Margin		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
2477.71	H	70.07	44.83	34.35	104.42	79.18					X/F
2483.50	H	21.68	-3.56	34.37	56.05	30.81	74.00	54.00	-17.95	-23.19	X/E
4953.66	H	44.95	19.71	6.82	51.77	26.53	74.00	54.00	-22.23	-27.47	X/H
7433.05	H	42.91	17.67	12.39	55.30	30.06	74.00	54.00	-18.70	-23.94	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/RSS-210			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(1)(iii) RSS-210, Issue 8, Annex 8, A8.1(d)	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.16, 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
RBW	100 KHz
VBW	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

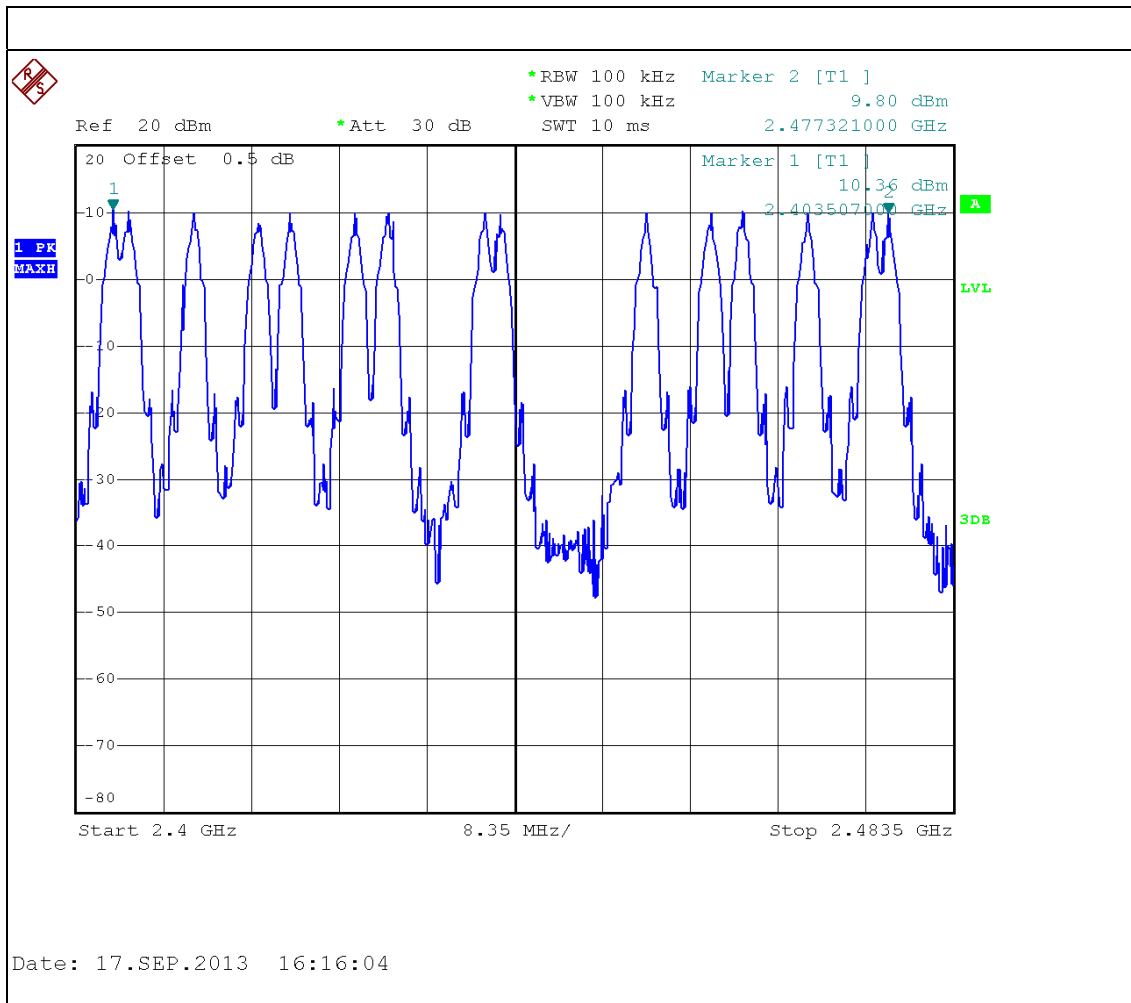
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.



5.1.6 TEST RESULTS

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60HZ
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/RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
5.247(a)(1)(iii) RSS-210, Issue 8, Annex 8, A8.1(d)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.1.1 MEASUREMENT INSTRUMENTS LIST

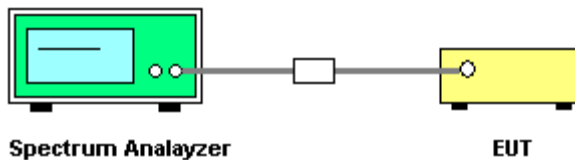
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.16, 2013

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.



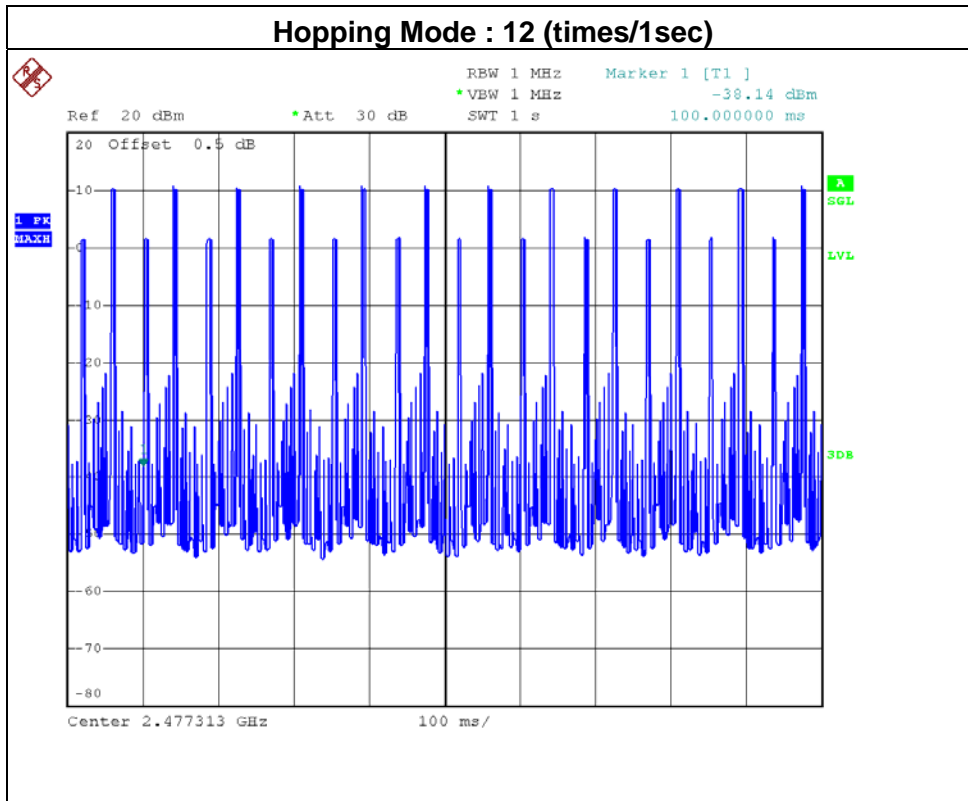
6.1.6. TEST RESULTS

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	Hopping Mode		

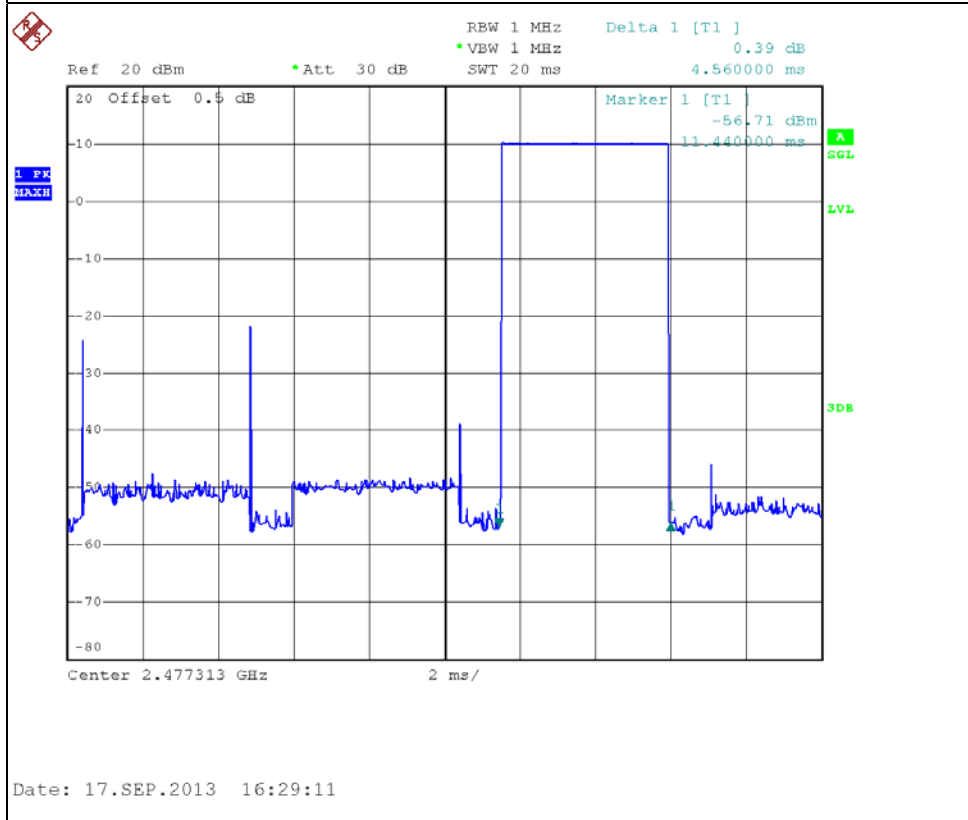
Mode	Number of transmission in a 6(15Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
2403.585 MHz	(12/1) *6=72 times Note1	4.56	328.32	400

Note1: 15 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)	4.56 ms
The total number of channels occupied within one cycle (2)	(12/1) *6=72 times
The average time of occupancy within one cycle(1)*(2)	328.32 msec
LIMIT (msec)	400msec



Date: 17.SEP.2013 16:11:03



Date: 17.SEP.2013 16:29:11

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.16, 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
RBW	30 KHz
VBW	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

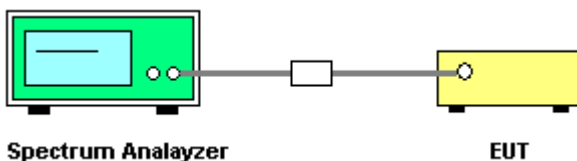
7.1.2 TEST PROCEDURE

- 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) \geq 1% of the span
Video (or Average) Bandwidth (VBW) \geq 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.

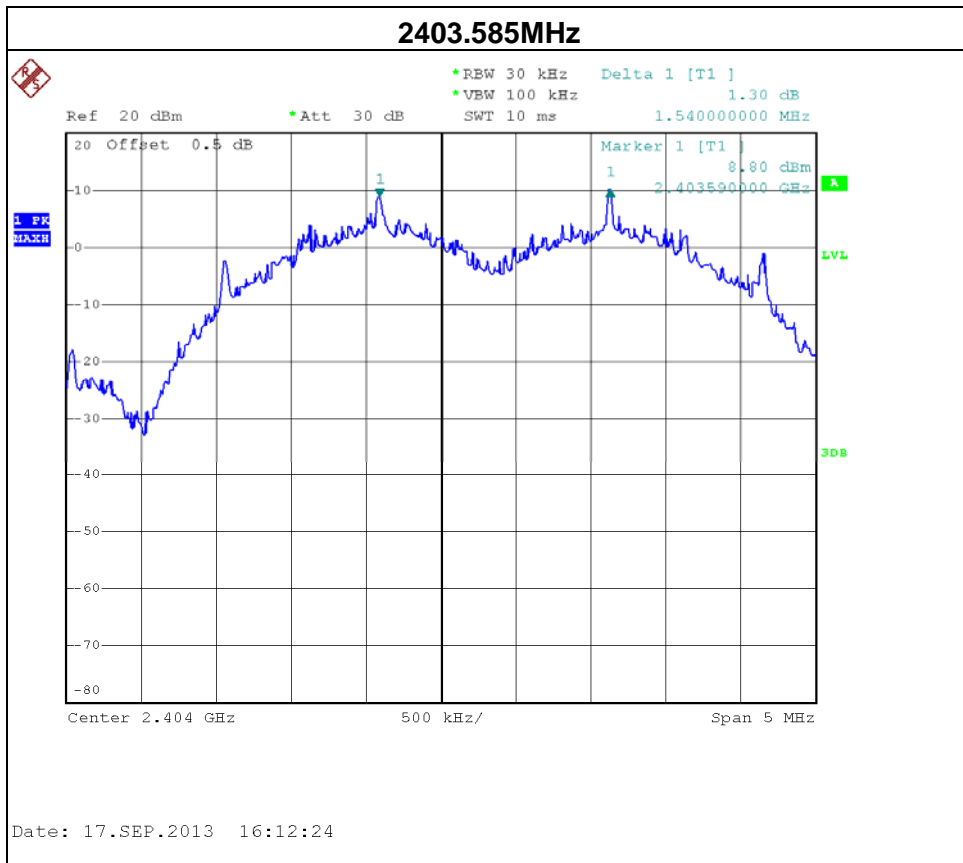


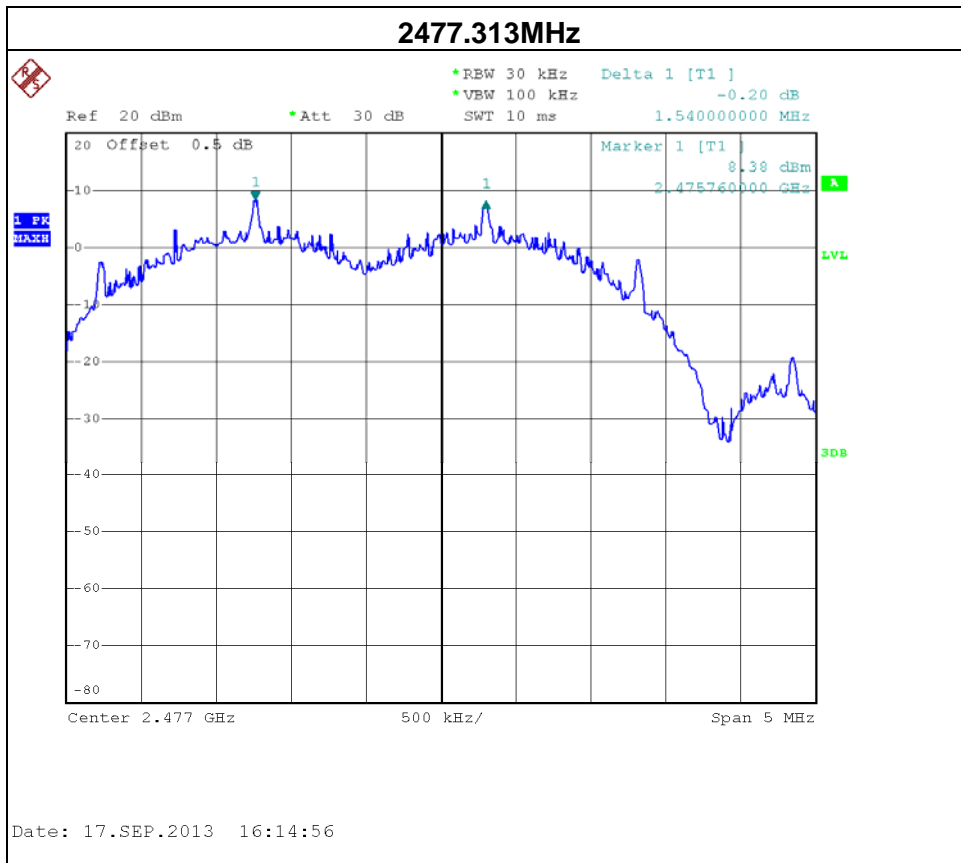
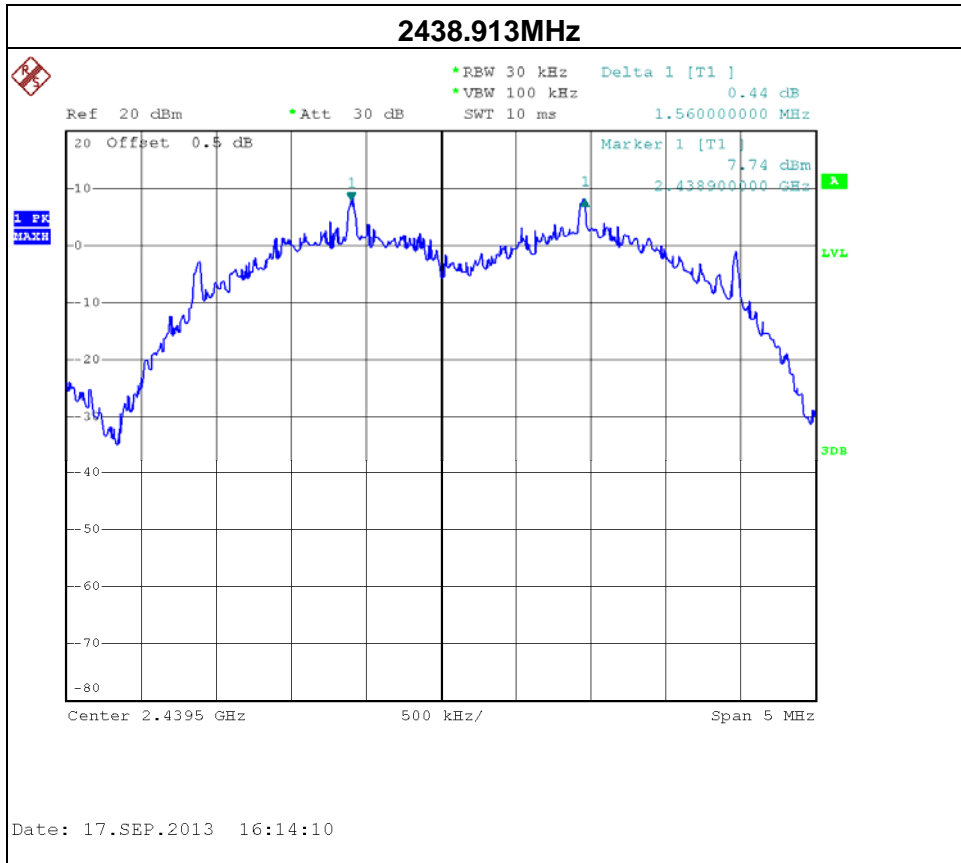
7.1.6 TEST RESULTS

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	CH01 / CH24 / CH49		

Frequency (MHz)	Ch. Separation (MHz)	2/3 of the 20 dB bandwidth (MHz)	Result
2403.585	1.540	1.513	Complies
2438.913	1.560	1.513	Complies
2477.313	1.540	1.527	Complies

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







8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/RSS-210			
Section	Test Item	Frequency Range (MHz)	Result
15.247(a)(1) RSS-GEN section 4.6.1 RSS-210, Issue 8, Annex 8, A8.1(b)	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.16, 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
RBW	30 KHz (20dB Bandwidth) / 30 KHz (Channel Separation)
VBW	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

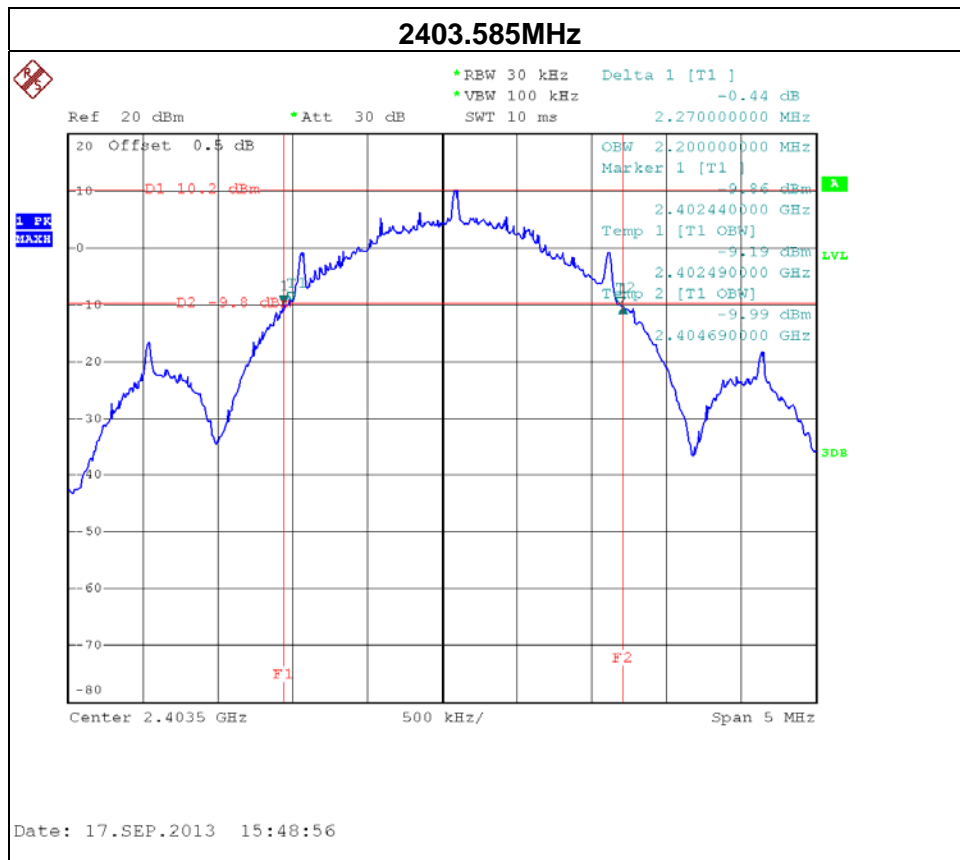
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

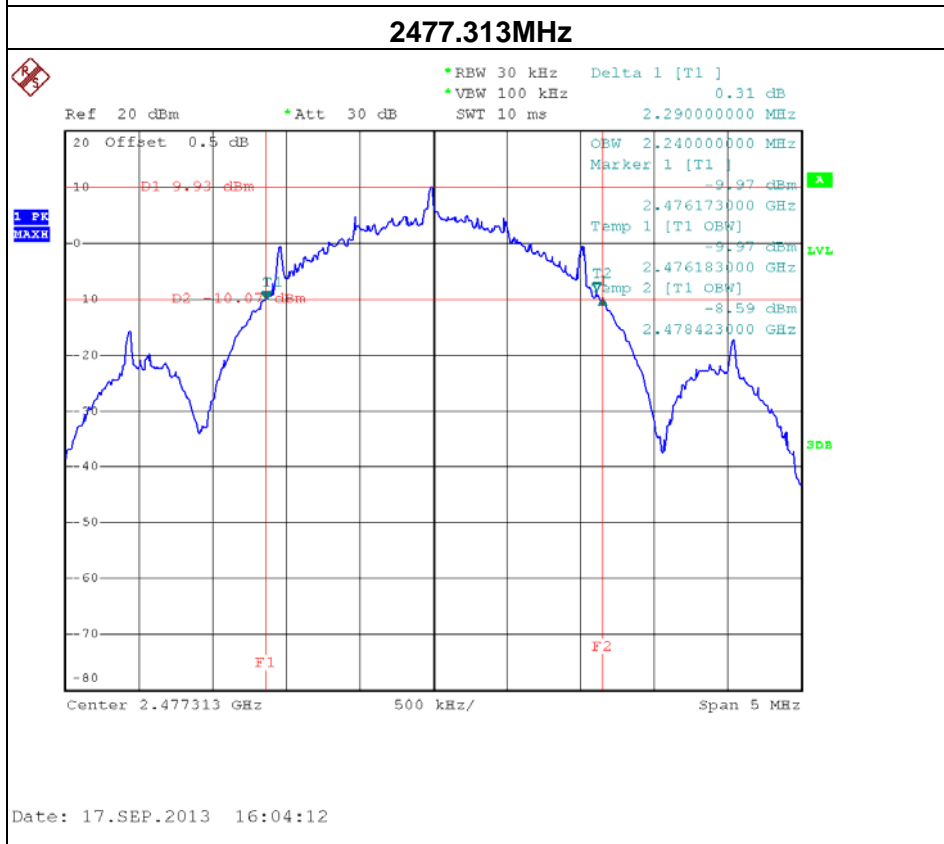
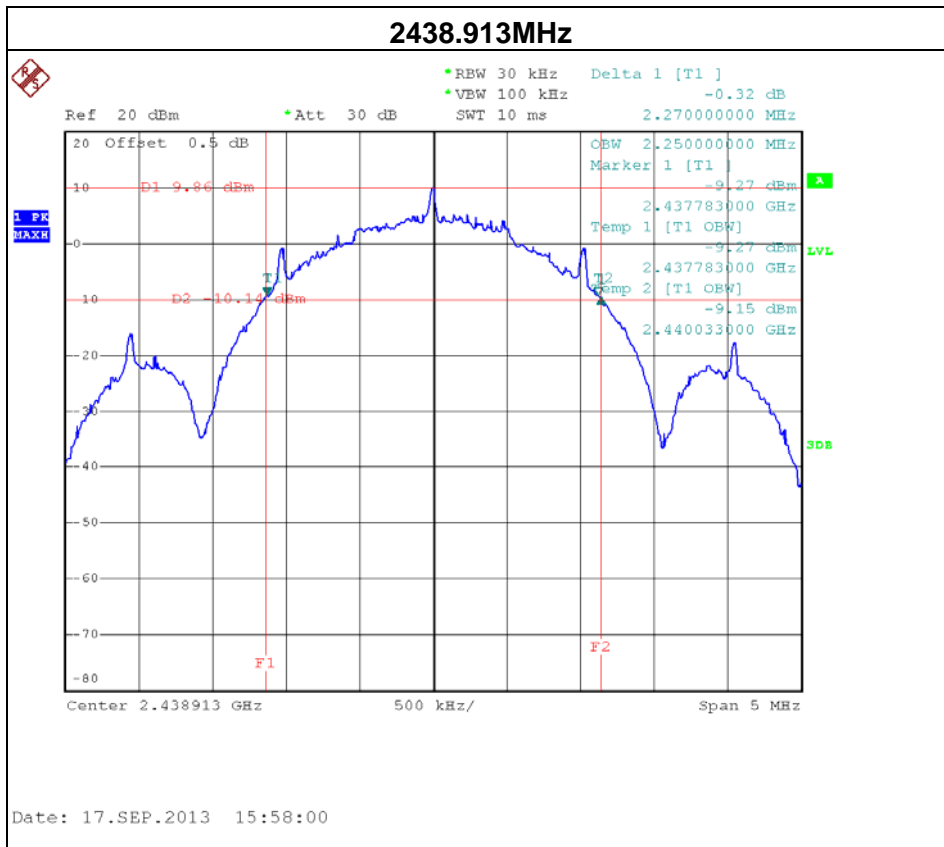


8.1.6 TEST RESULTS

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	CH01 / CH24 / CH49		

Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Result
2403.585	2.270	2.200	PASS
2438.913	2.270	2.250	PASS
2477.313	2.290	2.240	PASS







9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C/RSS-210				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1) RSS-GEN section 4.8 RSS-210, Issue 8, Annex 8, A8.1(b)	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.16, 2013

Remark: "N/A" denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

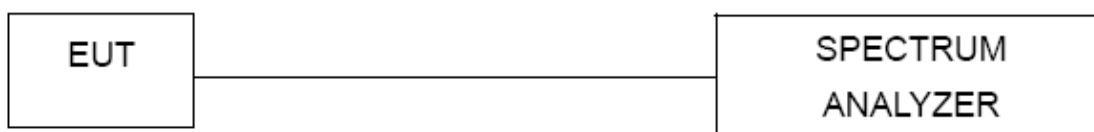
9.1.2 TEST PROCEDURE

- 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

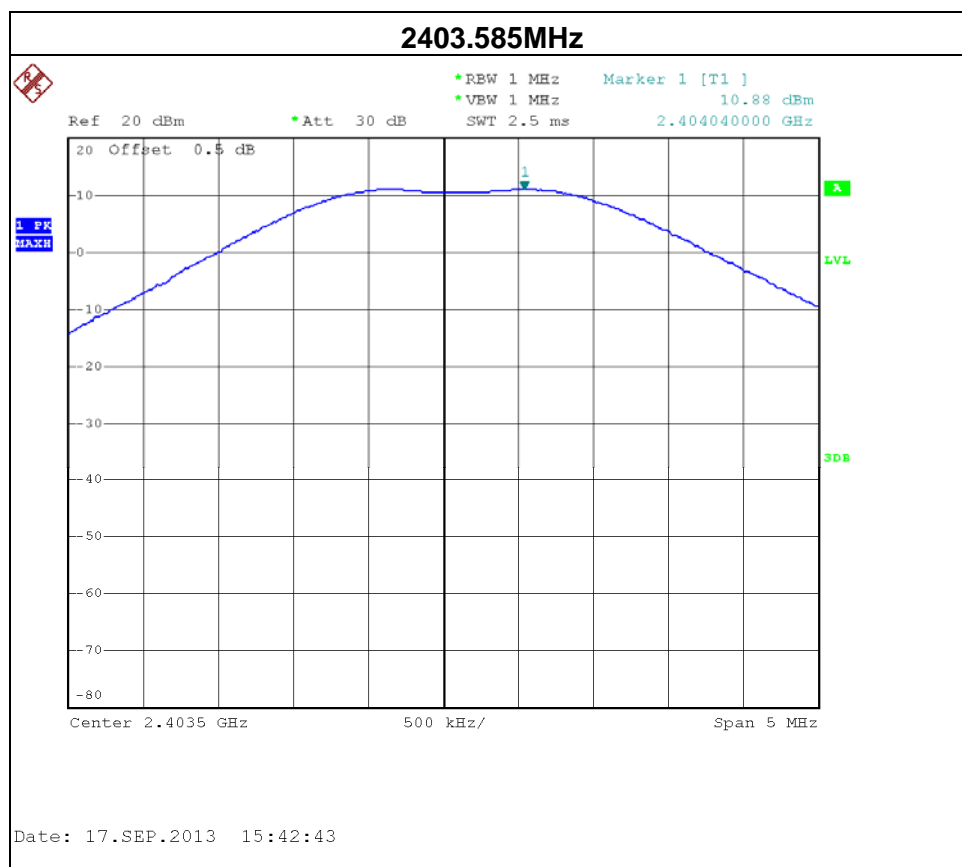
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

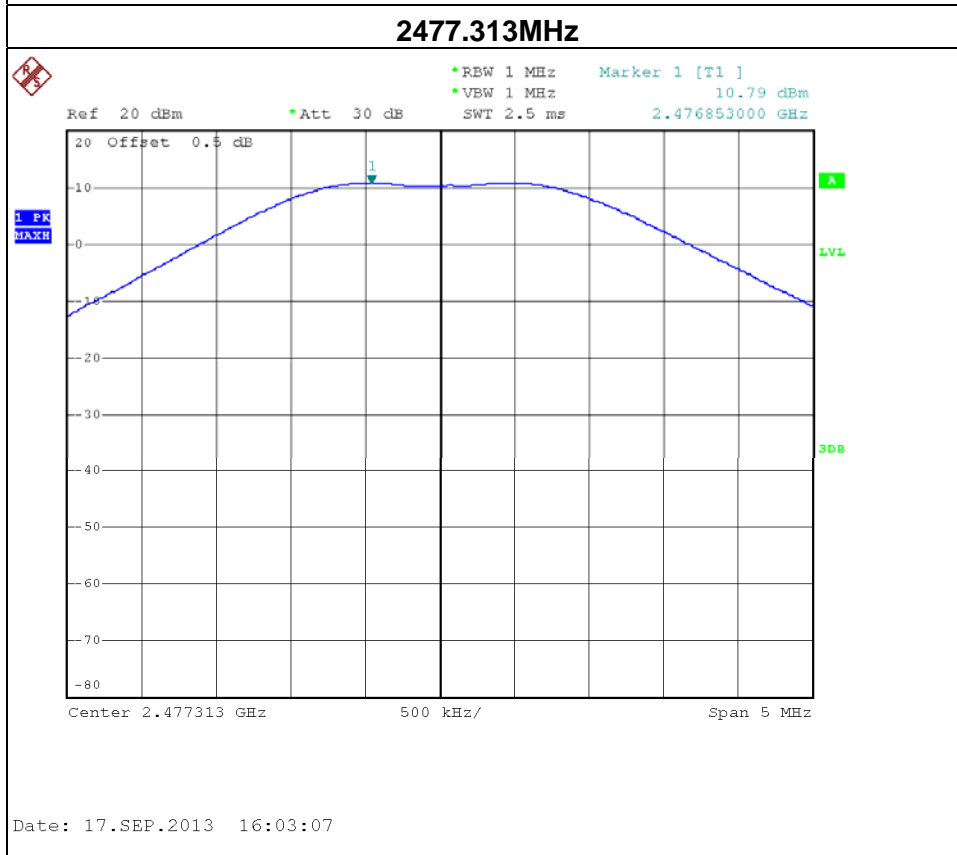
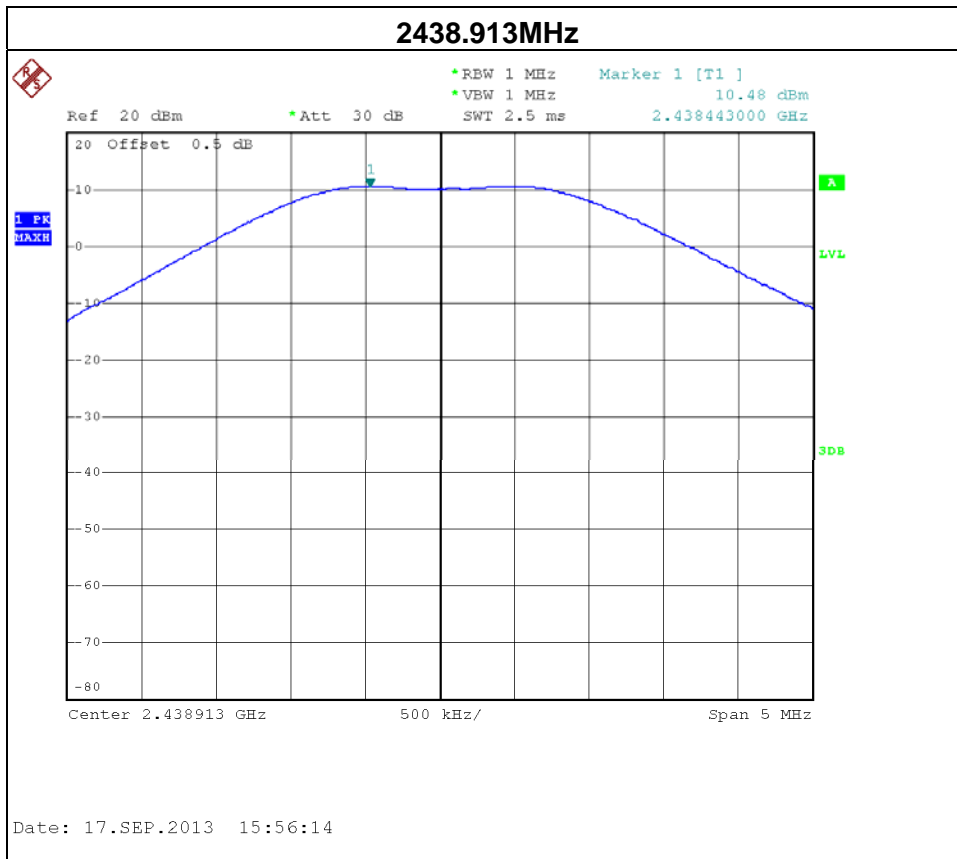


9.1.6 TEST RESULTS

EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	CH01 / CH24 / CH49		

Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Limit (W)
2403.585	10.88	21	0.125
2438.913	10.48	21	0.125
2477.313	10.79	21	0.125







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 (micovolts/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.16, 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.



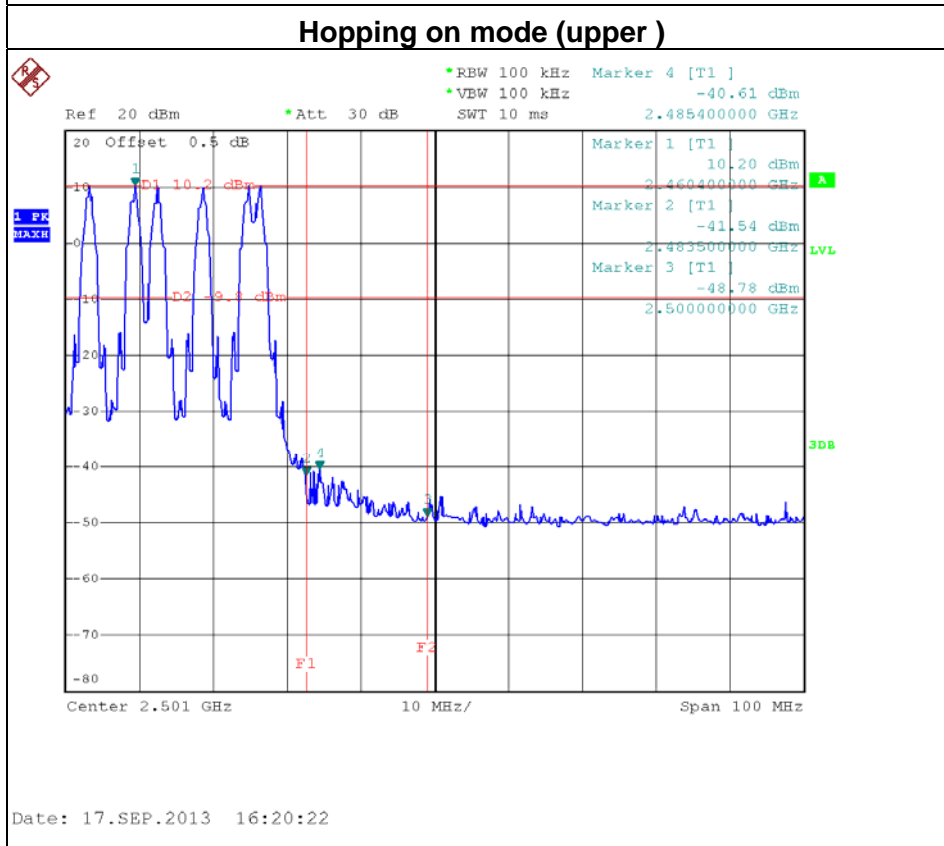
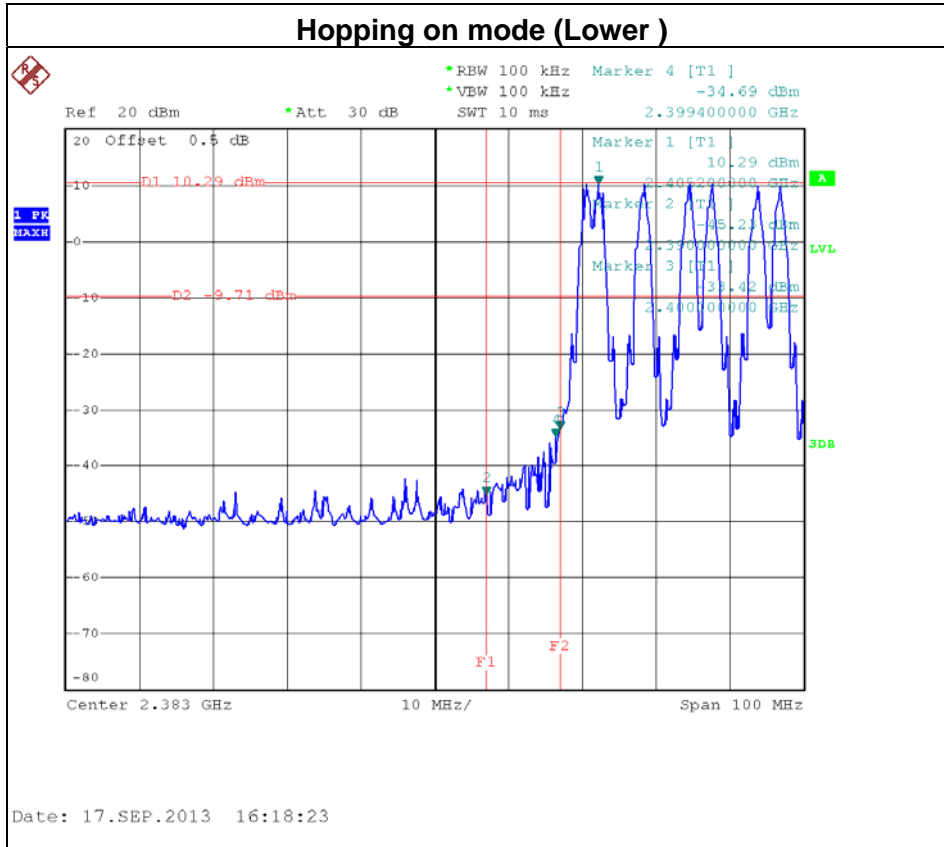
10.1.6 TEST RESULTS

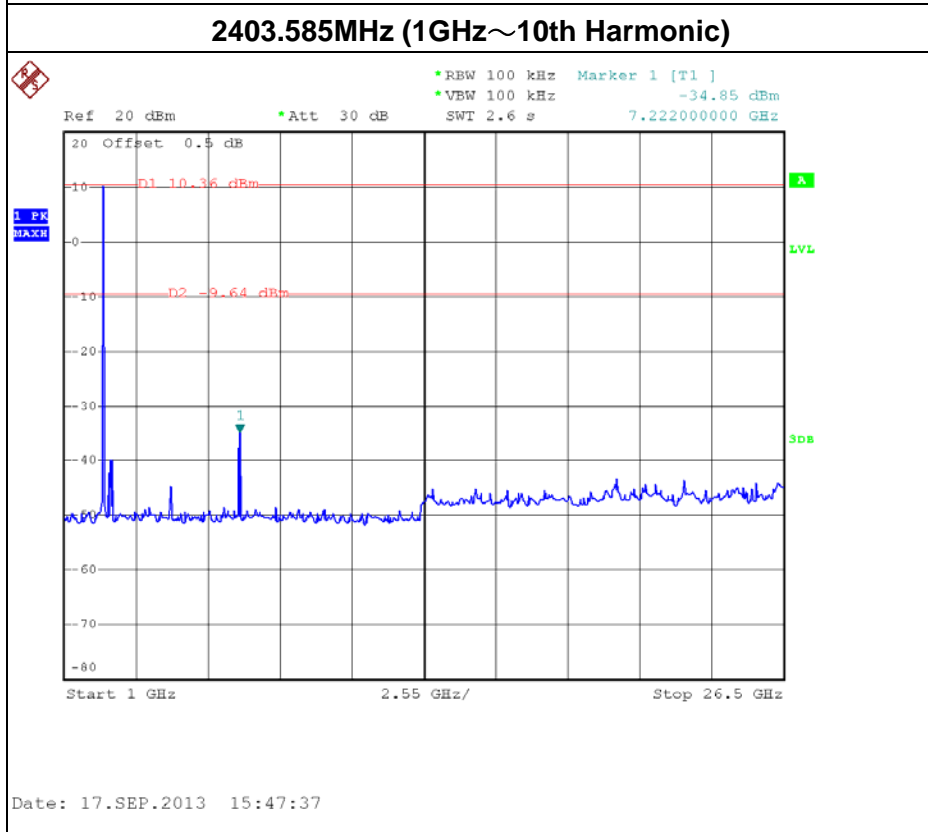
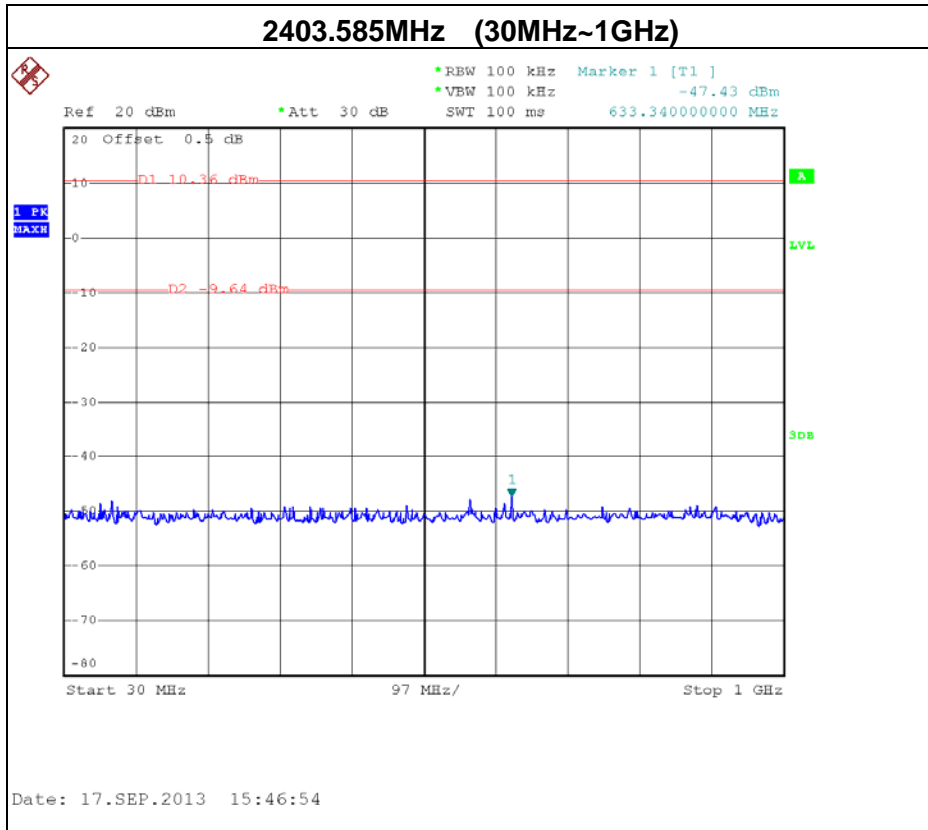
EUT:	SKAA Lightning connector Tx	Model Name :	PL5564-S
Temperature:	25 °C	Relative Humidity:	58 %
Pressure:	1009 hPa	Test Voltage :	AC 120V/60HZ
Test Mode :	CH01 / CH24 / CH49 & Hopping on mode		

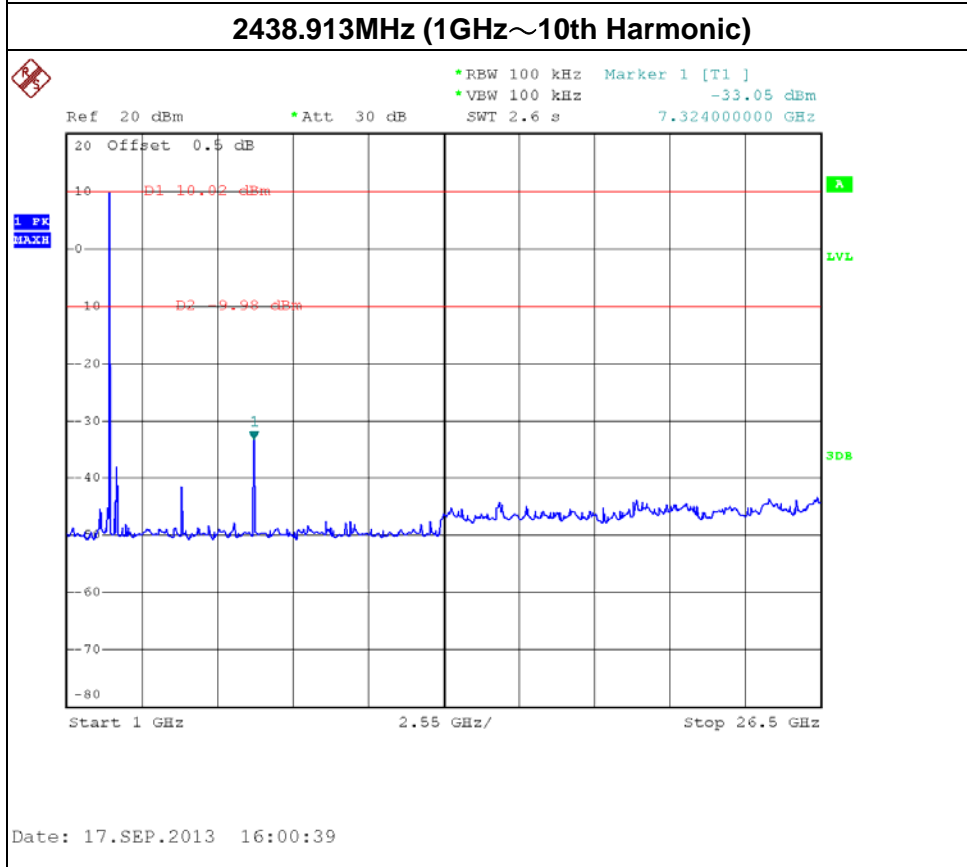
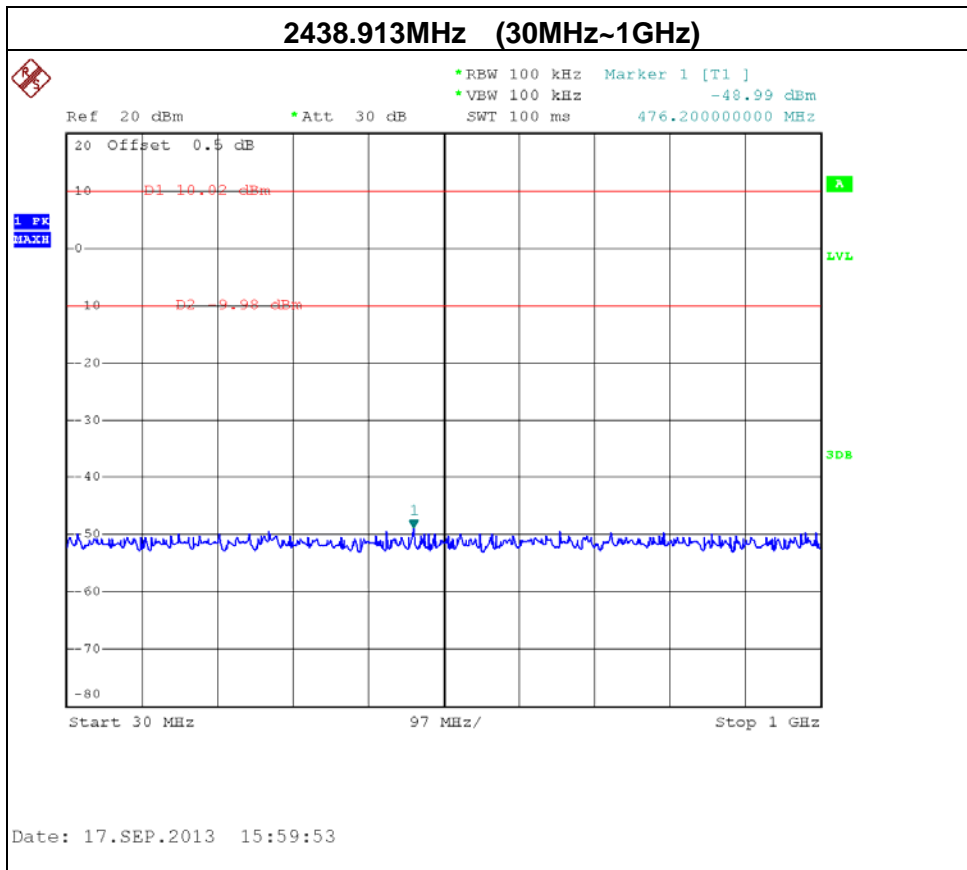
The max. radio frequency power in any 100KHz bandwidth outside the frequency band		The max. radio frequency power in any 100 KHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2400.00	-38.86	2489.60	-43.42

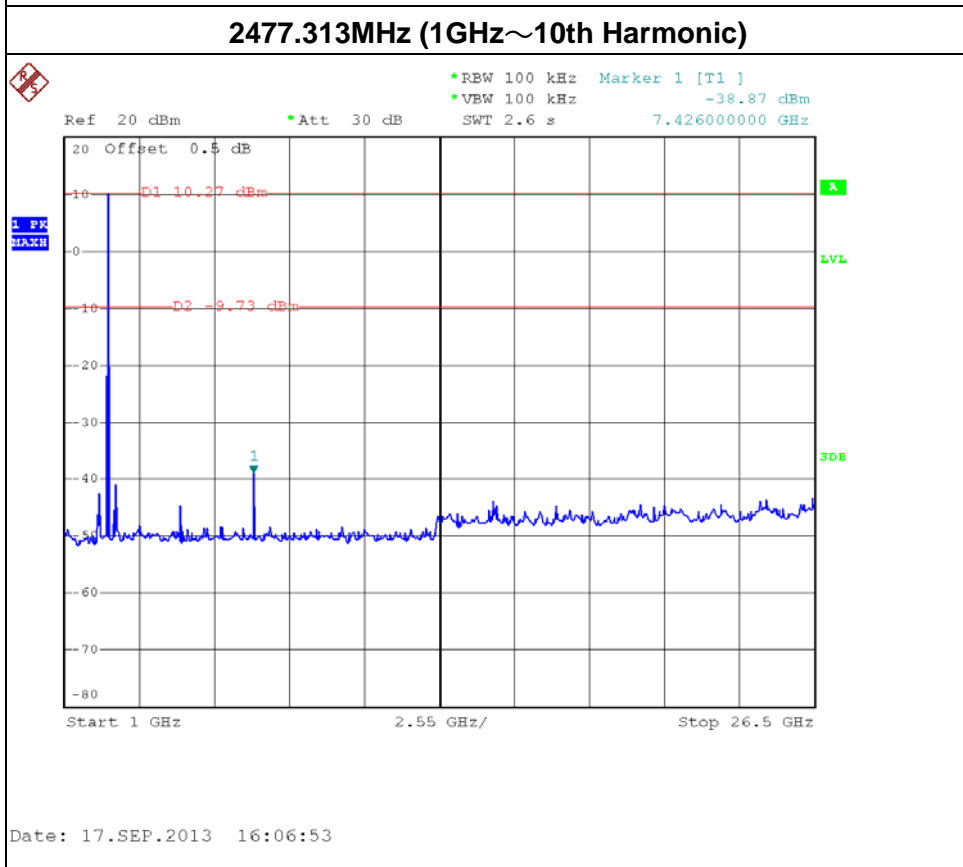
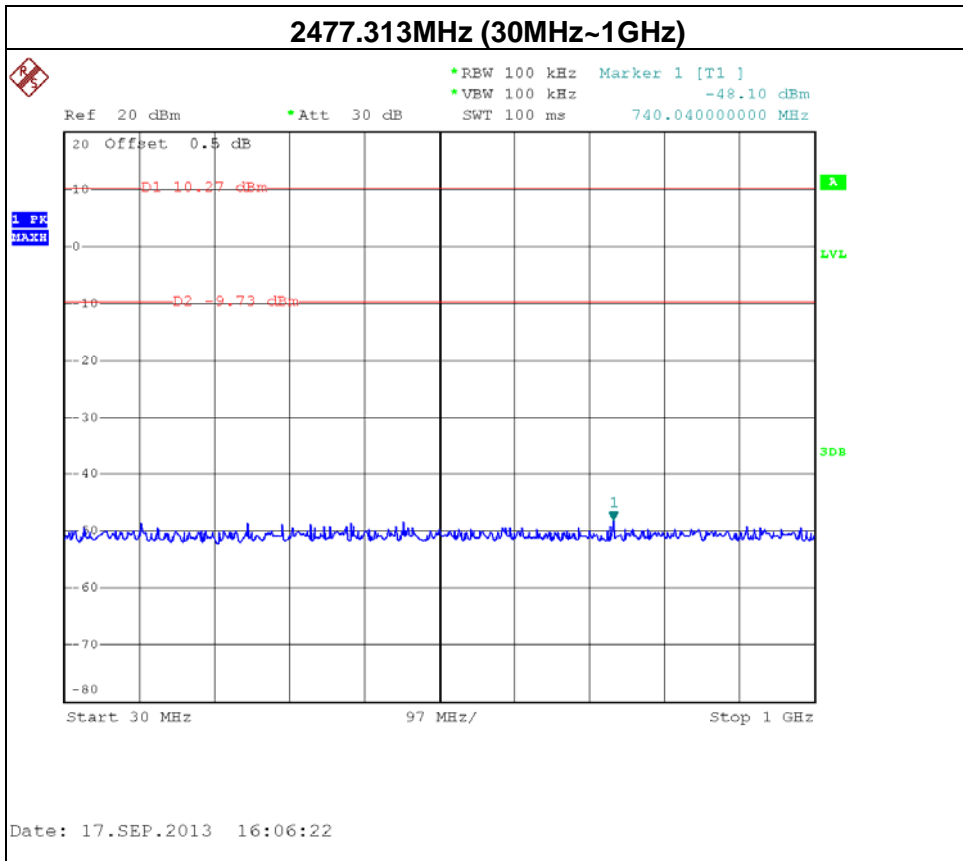
Result

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 level of the desired power.











11. EUT PHOTOS

**Radiated Measurement Photos
9KHz~30MHz**





**Radiated Measurement Photos
30~1000MHz**





**Radiated Measurement Photos
Above 1000MHz**

