



FCC TEST REPORT

FCC ID: 2AQSS-LP1200

On Behalf of

Litra, LLC

LitraPro

Model No.: LP1200

Prepared for : Litra, LLC
Address : 11251 Rancho Carmel Dr. #500592, San Diego, CA 92150

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

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Date of Receipt : July 11, 2018
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TEST REPORT DECLARATION

Applicant : Litra, LLC
Address : 11251 Rancho Carmel Dr. #500592, San Diego, CA 92150
Manufacturer : Shanghai FES Innovation Co., Ltd.
Address : Room 401, 4th Floor, Building 15, No. 188 Xin Jun Ring Road, Shanghai, China
Model Name : LitraPro
(A) Model No. : LP1200
(B) Trademark : Litra

Measurement Standard Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2017,
ANSI C63.10-2013**

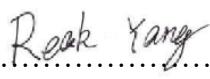
The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:

Reak Yang
Project Engineer


.....

Approved by (name + signature).....:

Simple Guan
Project Manager


.....

Date of issue.....

July 18, 2018

Revision History

Revision	Issue Date	Revisions	Revised By
00	July 18, 2018	Initial released Issue	Simple Guan

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Test Requirement	Standards Paragraph	Result
Conducted Emission	FCC PART 15:2017	15.207	P
6dB Bandwidth	FCC PART 15:2017	15.247 (a)(2)	P
Output Power	FCC PART 15:2017	15.247 (b)(3)	P
Radiated Spurious Emission	FCC PART 15:2017	15.247 (c)	P
Conducted Spurious & Band Edge Emission	FCC PART 15:2017	15.247 (d)	P
Power Spectral Density	FCC PART 15:2017	15.247 (e)	P
Radiated Band Edge Emission	FCC PART 15:2017	15.205	P
Antenna Requirement	FCC PART 15:2017	15.203	P
RF Exposure Evaluation	KDB447498 D01V06	4.1(f), 4.3.1(a)	P
Note:		1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.	

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description : The product is built with Bluetooth compatibility, adjustable color temperature, and fully dimmable lighting

Model Name : LitraPro

Model Number : LP1200

Diff : N/A

Trademark : Litra

Test Voltage : DC 3.7V from battery (two lithium batteries of 3.7V connect in parallel)
DC 5V From USB Port

Bluetooth Version : Bluetooth 4.2 BLE

Operation frequency : 2402-2480MHz

Channel No. : 40 Channels

Modulation type : GFSK

Antenna Type : Wire Antenna, Maximum Gain is 0dBi

Software version : V1.0

Hardware version : V1.0

Product Size : Length: 70mm
Width: 27mm
Height: 50mm

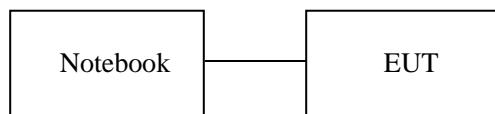
2.2. Accessories of Device (EUT)

Power Source : N/A

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Notebook	ACER	ZQT	N/A	DOC

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH0	2402
	Middle: CH19	2440
	High: CH39	2480

2.6. Test Conditions

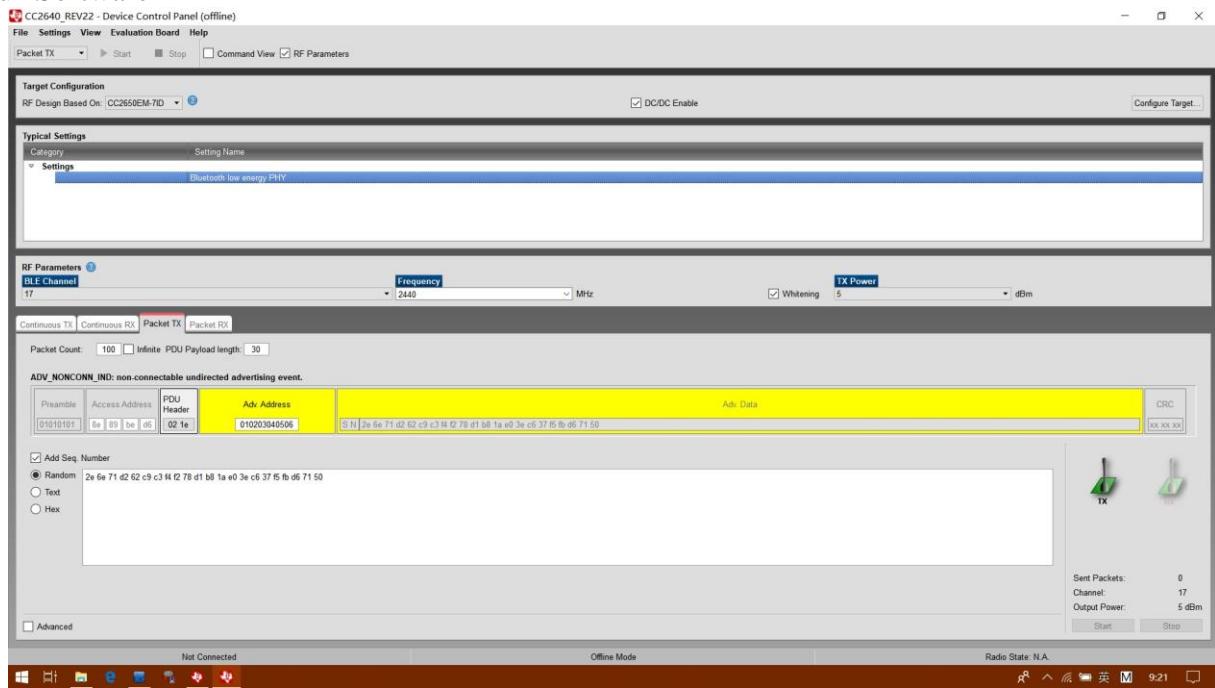
Items	Required	Actual
Temperature range:	15-35°C	25°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	0.98kPa

2.7. Additional instructions

Software (Used for test) from client

Mode	Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.		
Power level setup in software			
Test Software Name	SmartRF Studio 7-CC2640		
Test Software Version	REV22		
Mode	Channel	Frequency (MHz)	Software Set
GFSK	CH0	2402	TX level is set as defaults value.
	CH19	2440	
	CH39	2480	

Run Software



2.8. Test Facility

Shenzhen Alpha Product Testing Co., Ltd
 Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
 Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
 Registration Number: 293961
 Designation Number: CN1236

July 25, 2017 Certificated by IC
 Registration Number: 12135A

2.9. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.8×10^{-8}
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	%
Uncertainty for DC and low frequency voltages	0.06%

2.10. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
3m Semi-Anechoic	ETS-LINDGR EN	N/A	SEL0017	2017.09.22	1Year
Spectrum analyzer	Agilent	E4407B	MY46185649	2017.09.22	1Year
Receiver	R&S	ESCI	1166.5950K03-101 1	2017.09.22	1Year
Receiver	R&S	ESCI	101202	2017.09.22	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2016.09.30	2Year
Horn Antenna	EMCO	3115	640201028-06	2016.09.30	2Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2016.09.30	2Year
Cable	Resenberger	N/A	No.1	2017.09.22	1Year
Cable	SCHWARZBE CK	N/A	No.2	2017.09.22	1Year
Cable	SCHWARZBE CK	N/A	No.3	2017.09.22	1Year
Pre-amplifier	Schwarzbeck	BBV9743	9743-019	2017.09.22	1Year
Pre-amplifier	R&S	AFS33-1800265 0-30-8P-44	SEL0080	2017.09.22	1Year
Temperature controller	Terchy	MHQ	120	2017.09.22	1Year
Power divider	Anritsu	K240C	020346	2017.09.22	1 Year
Signal Generator	HP	83732B	VS3449051	2017.09.22	1 Year
Power Meter	Anritsu	ML2487A	6K00001491	2017.09.22	1Year

Power sensor	Anritsu	ML2491A	32516	2017.09.22	1 Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2017.09.22	1 Year
L.I.S.N.#2	ROHDE&SCH WARZ	ENV216	101043	2017.09.22	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2017.09.22	1 Year
Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA 9170294	2017.02.22	2 Year

3. SPURIOUS EMISSION

3.1. Test Limits

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

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

NOTE:

- a) The tighter limit applies at the band edges.
- b) Emission Level(dB uV/m)=20log Emission Level(uV/m)

3.2. Test Procedure

The measuring distance of 3m shall be used for measurements at frequency up to 1GH and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground for below 1GHz and 1.5m high for above1GHz testing, the table was rotated 360 degrees to determine the position of the highest radiation

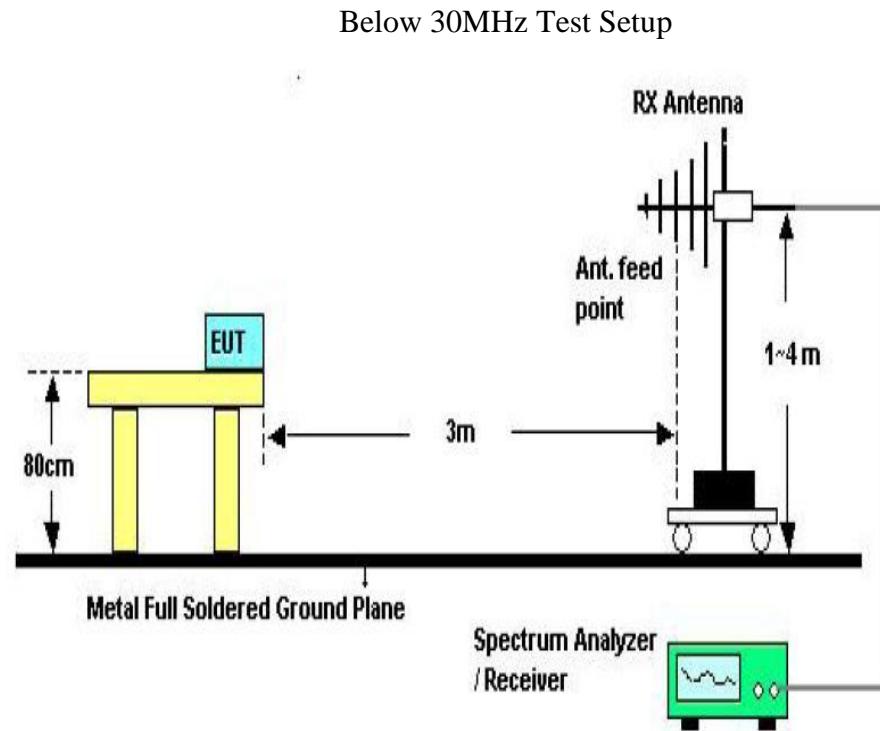
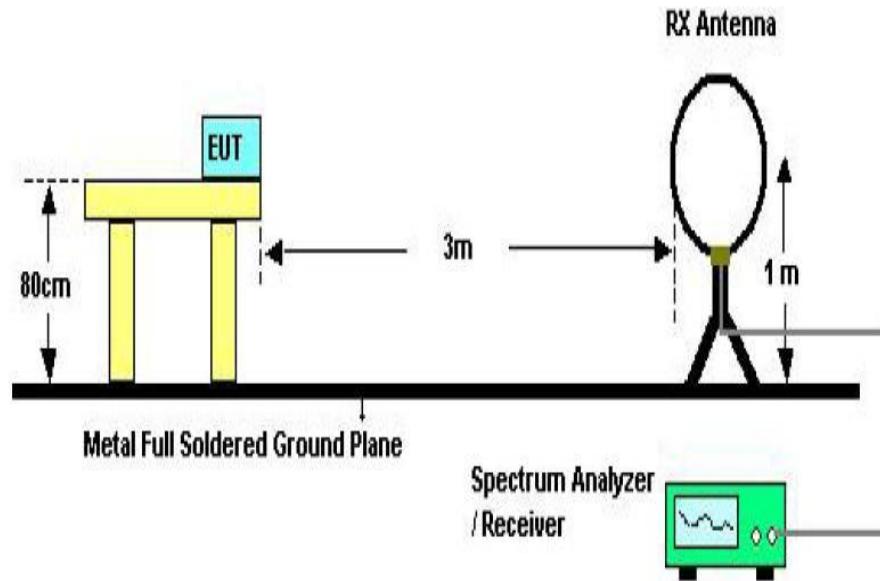
The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set of make measurement.

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 Qusia Peak Detector mode premeasured

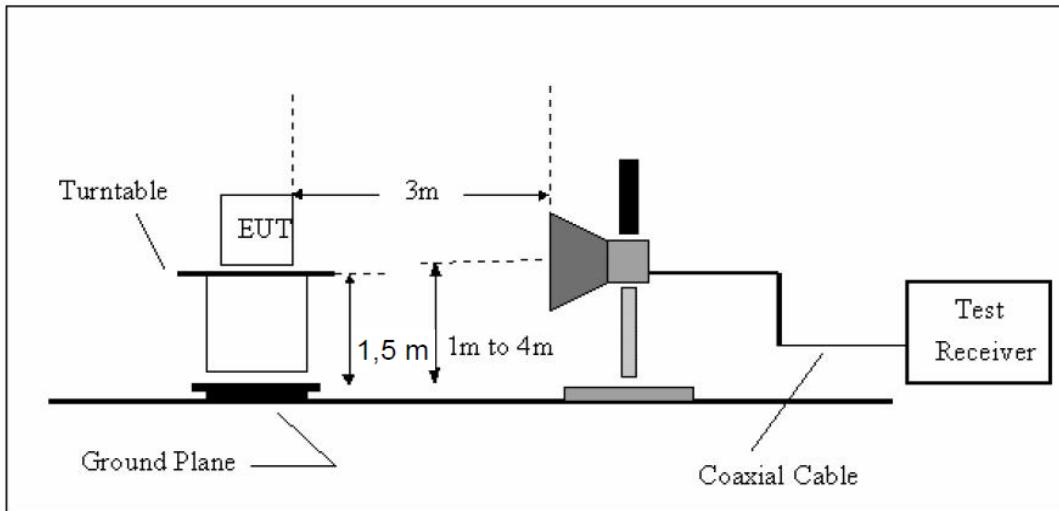
If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit. But the Peak value and average value both need to comply with applicable limit above 1GHz.

For the actual test configuration, please see the test setup photo.

3.3. Test Setup



Above 30MHz Test Setup



Above 1GHz Test Setup

3.4. Test Results

Test Condition

Continually Transmitting in maximum power.

9KHz~150KHz	RBW200Hz	VBW1KHz
150KHz~30MHz	RBW9KHz	VBW 30KHz
30MHz~1GHz	RBW120KHz	VBW 300KHz
Above1GHz	RBW1MHz	VBW 3MHz

We have scanned the 10th harmonic from 9 kHz to the EUT.

Detailed information please see the following page.

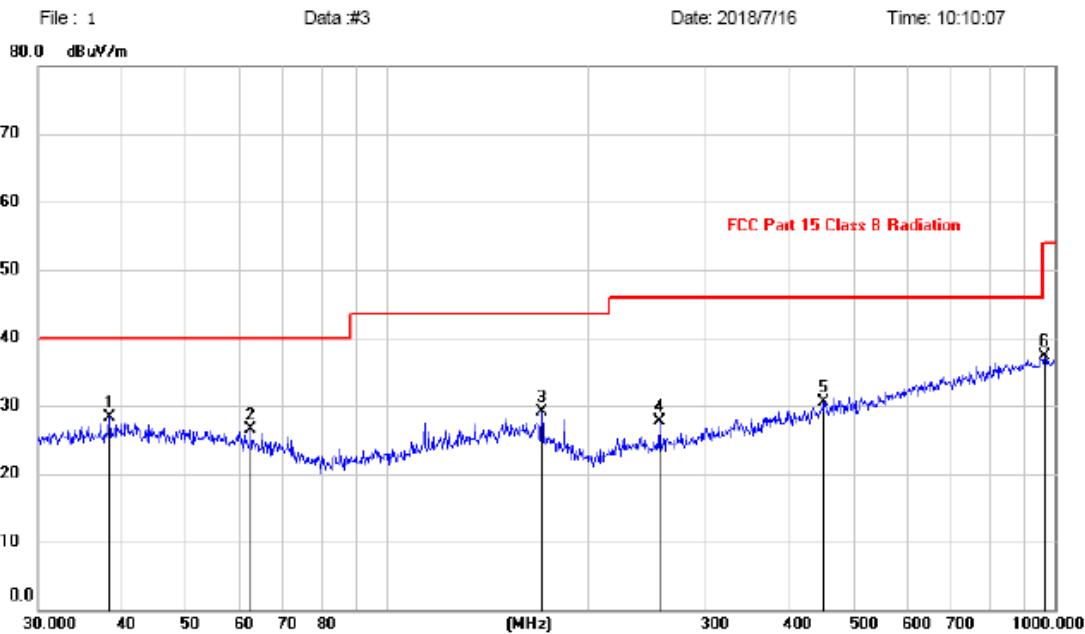
From 9KHz to 30MHz: Conclusion: PASS

Note: 1. If the amplitude of the spurious emission is more than 20dB above the allowable value, it's considered too low relative to the limit value, no necessary to report.

2. For above 1GHz test, if peak Result comply with AV limit, AV Result is deemed to comply with AV limit, no necessary to report.

Vertical

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table	
									cm	degree
		MHz	dB μ V	dB	dB μ V/m	dB	Detector			Comment
1	*	38.3462	14.45	13.95	28.40	40.00	-11.60	peak		
2		62.6507	14.10	12.31	26.41	40.00	-13.59	peak		
3		170.1948	15.27	13.74	29.01	43.50	-14.49	peak		
4		255.6231	15.52	12.21	27.73	46.00	-18.27	peak		
5		451.1350	13.47	17.01	30.48	46.00	-15.52	peak		
6		968.9338	13.41	23.86	37.27	54.00	-16.73	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Horizontal

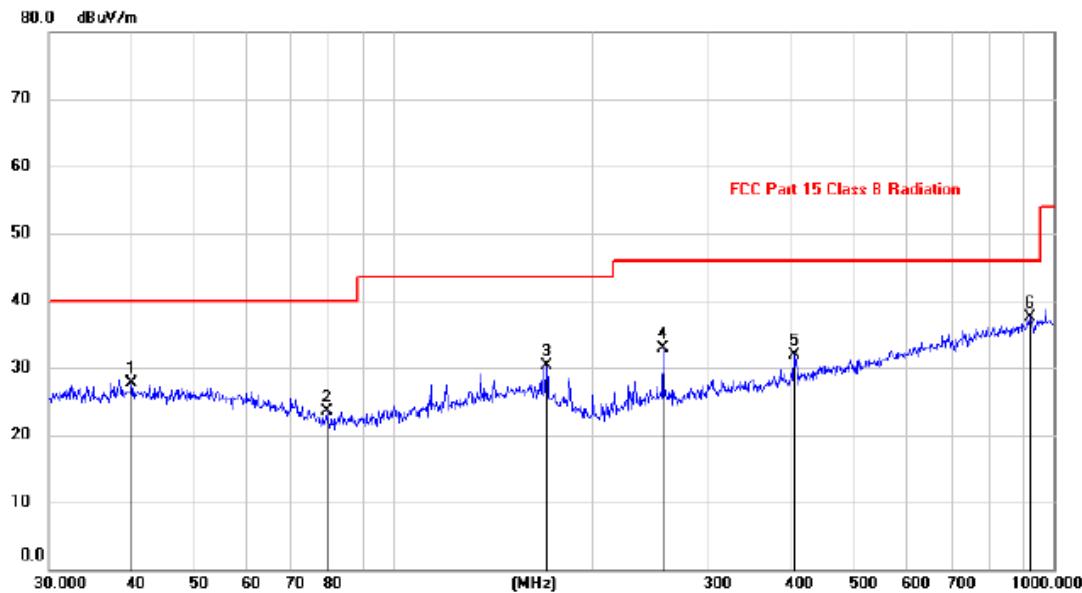
Radiated Emission Measurement

File :1

Data #4

Date: 2018/7/16

Time: 10:11:28

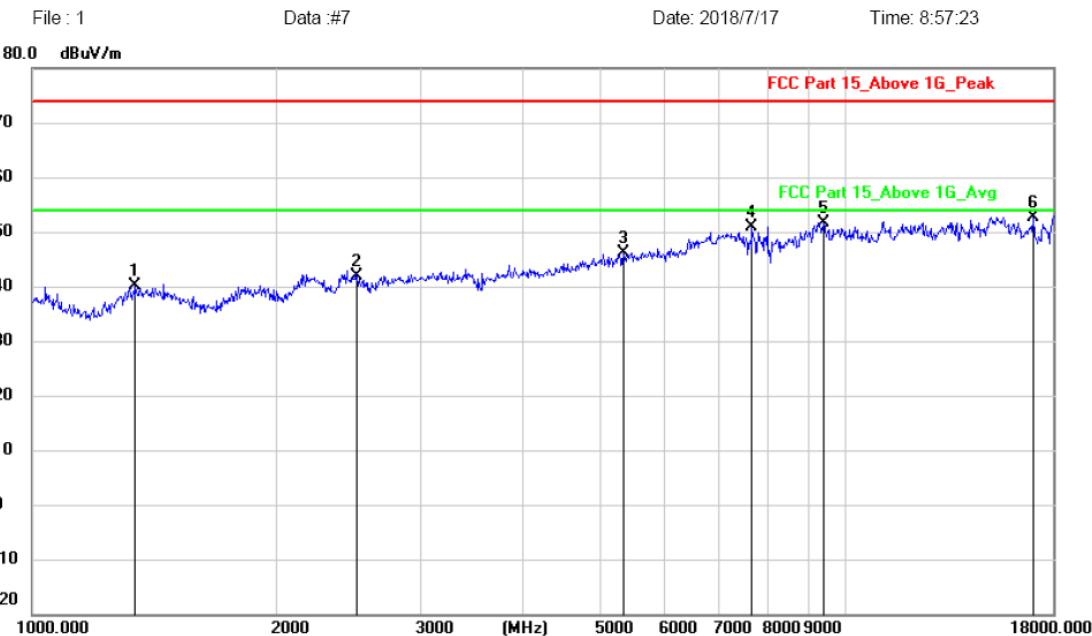


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		39.9942	13.55	14.24	27.79	40.00	-12.21	peak			
2		78.9652	13.89	9.53	23.42	40.00	-16.58	peak			
3		170.1948	16.64	13.74	30.38	43.50	-13.12	peak			
4		255.6231	20.62	12.21	32.83	46.00	-13.17	peak			
5		404.6665	16.23	15.66	31.89	46.00	-14.11	peak			
6	*	919.2866	13.92	23.59	37.51	46.00	-8.49	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.

2. Measurements=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

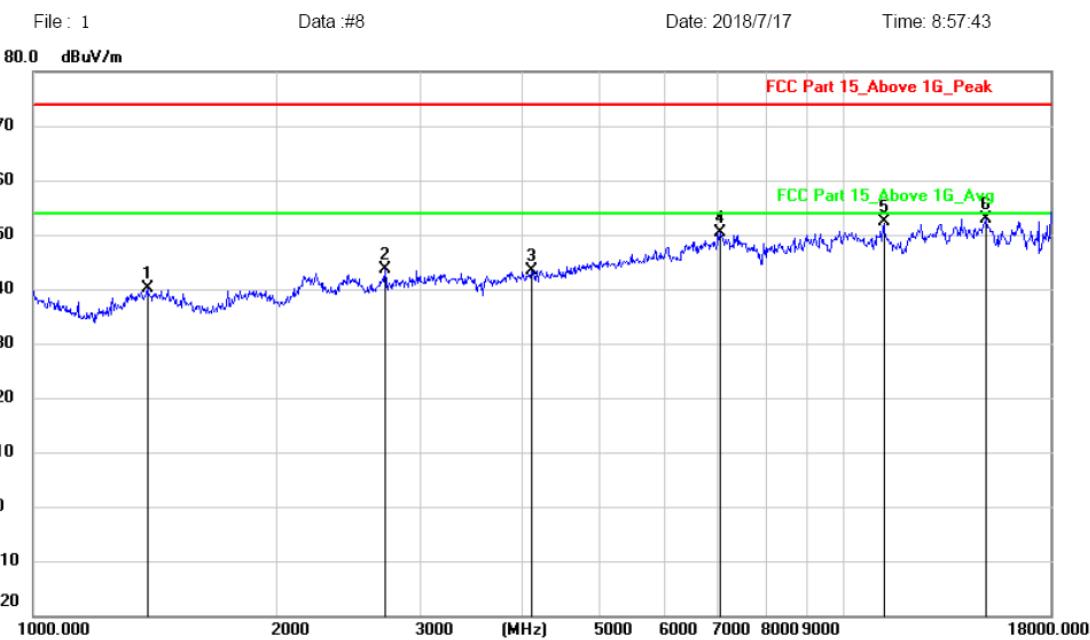
Notes: Above is below 1GHz test data. This report only shall the worst case mode for TX 2402MHz.

TX:2402MHz Horizontal**Radiated Emission Measurement**

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree								
									MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
1		1339.006	47.44	-7.20	40.24	74.00	-33.76	peak									
2		2507.129	45.25	-3.36	41.89	74.00	-32.11	peak									
3		5330.927	48.12	-2.03	46.09	74.00	-27.91	peak									
4		7673.034	47.71	3.21	50.92	74.00	-23.08	peak									
5		9393.689	48.14	3.50	51.64	74.00	-22.36	peak									
6	*	17038.14	45.72	6.91	52.63	74.00	-21.37	peak									

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX:2402MHz Vertical**Radiated Emission Measurement**

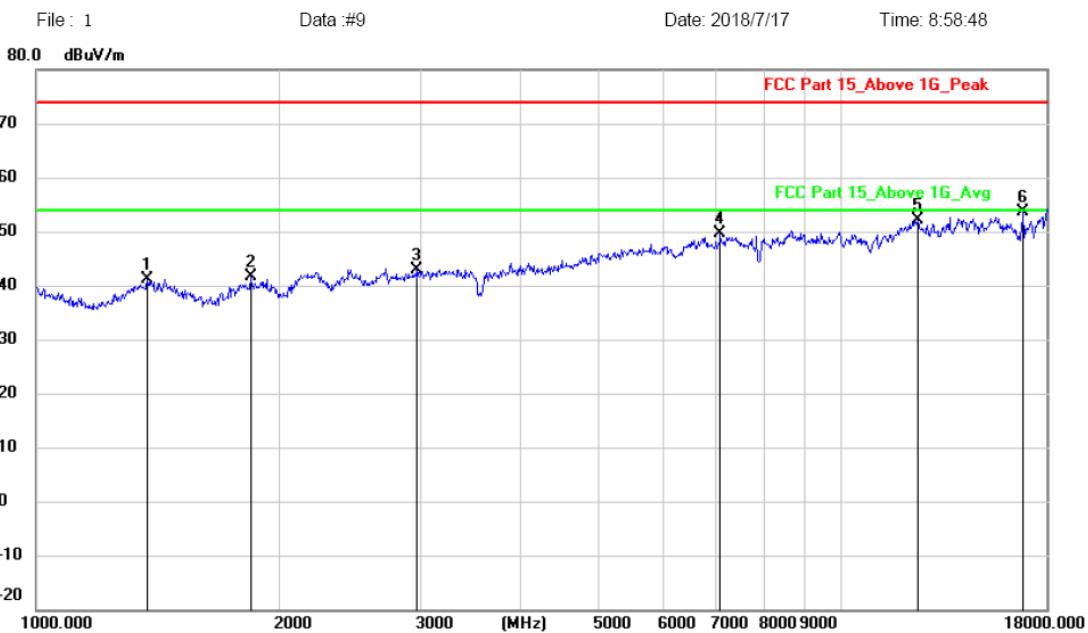
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm degree
1	1382.263	47.16	-7.06	40.10	74.00	-33.90	peak		
2	2718.468	46.53	-2.90	43.63	74.00	-30.37	peak		
3	4121.768	48.22	-4.78	43.44	74.00	-30.56	peak		
4	7035.726	47.73	2.67	50.40	74.00	-23.60	peak		
5	11204.89	46.67	5.79	52.46	74.00	-21.54	peak		
6	*	14960.12	45.01	7.98	52.99	74.00	-21.01	peak	

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX:2440MHz Vertical

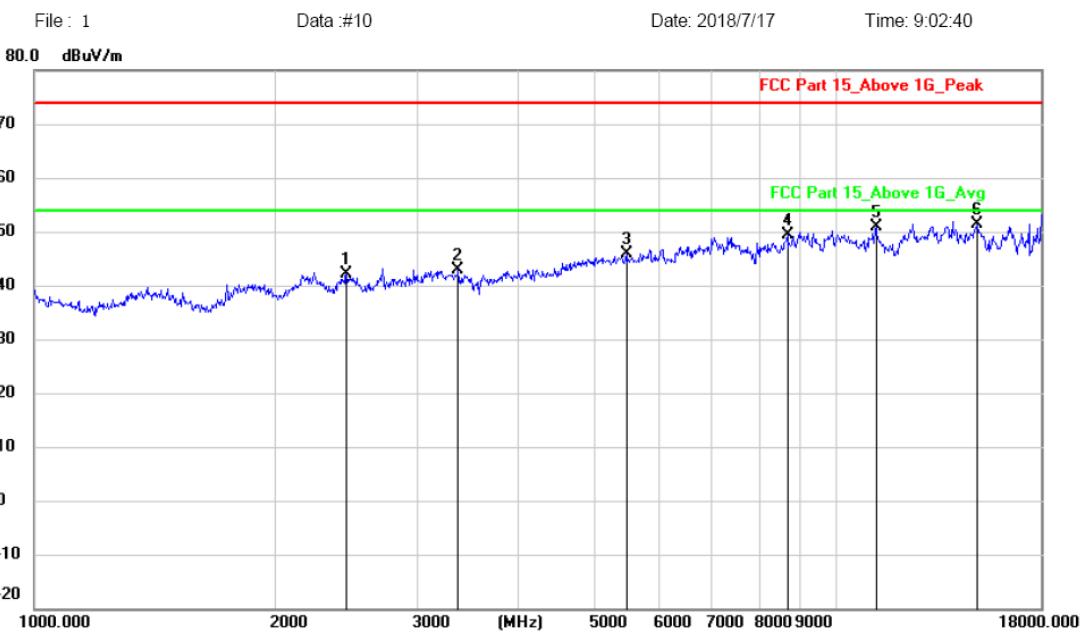
Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	1374.295	48.33	-7.08	41.25	74.00	-32.75	peak			
2	1845.516	47.93	-6.25	41.68	74.00	-32.32	peak			
3	2973.293	45.20	-2.39	42.81	74.00	-31.19	peak			
4	7076.516	46.64	2.87	49.51	74.00	-24.49	peak			
5	12469.61	46.65	5.42	52.07	74.00	-21.93	peak			
6	*	16842.29	47.63	6.06	53.69	74.00	-20.31	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX:2440MHz Horizontal**Radiated Emission Measurement**

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree								
									MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
1	2449.822	45.58	-3.40	42.18	74.00	-31.82	peak										
2	3376.523	49.89	-7.05	42.84	74.00	-31.16	peak										
3	5471.422	47.58	-1.78	45.80	74.00	-28.20	peak										
4	8688.481	45.52	3.89	49.41	74.00	-24.59	peak										
5	11204.89	45.17	5.79	50.96	74.00	-23.04	peak										
6	* 14960.12	43.51	7.98	51.49	74.00	-22.51	peak										

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

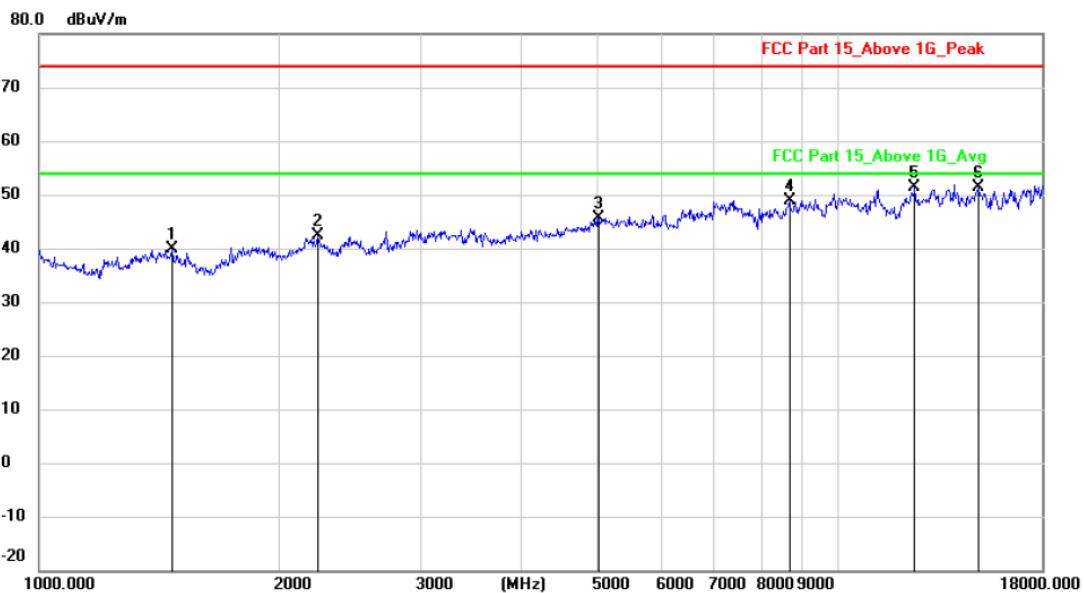
TX:2480MHz Horizontal**Radiated Emission Measurement**

File : 1

Data :#11

Date: 2018/7/17

Time: 9:05:00



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table									
									MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	1468.761	46.86	-7.00	39.86	74.00	-34.14	peak											
2	2233.396	45.65	-3.33	42.32	74.00	-31.68	peak											
3	5016.976	48.18	-2.46	45.72	74.00	-28.28	peak											
4	8688.481	45.02	3.89	48.91	74.00	-25.09	peak											
5	12469.61	45.88	5.42	51.30	74.00	-22.70	peak											
6	*	14960.12	43.51	7.98	51.49	74.00	-22.51	peak										

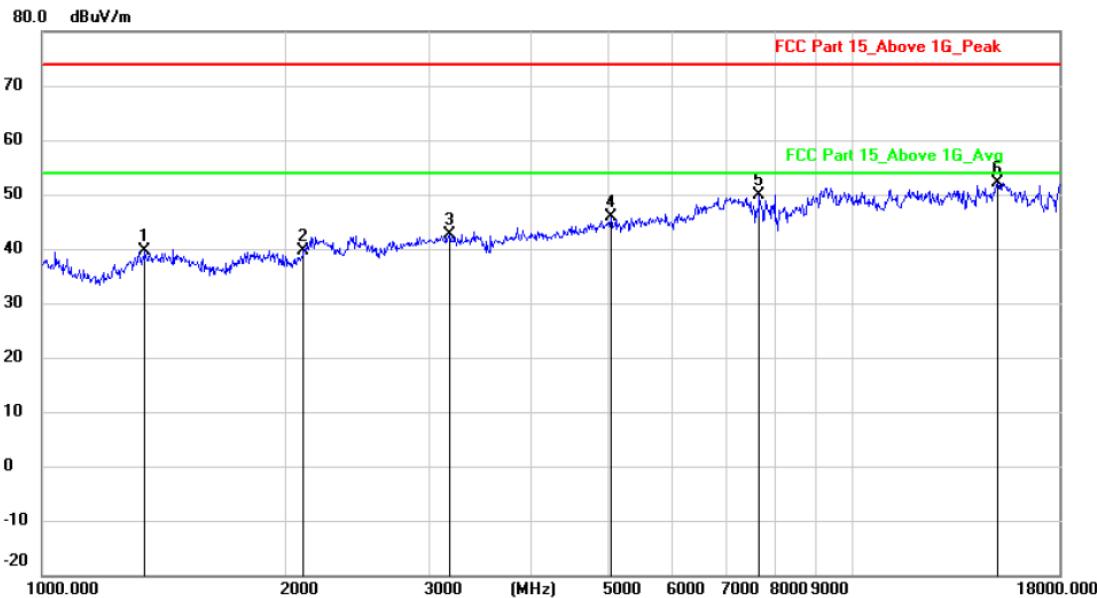
Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX:2480MHz Vertical

Radiated Emission Measurement

File : 1 Data :#12 Date: 2018/7/17 Time: 9:09:28



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	1339.006	46.94	-7.20	39.74	74.00	-34.26	peak			
2	2101.866	43.86	-4.11	39.75	74.00	-34.25	peak			
3	3186.869	44.78	-2.14	42.64	74.00	-31.36	peak			
4	5031.498	48.27	-2.43	45.84	74.00	-28.16	peak			
5	7673.034	46.71	3.21	49.92	74.00	-24.08	peak			
6	*	15090.40	44.62	7.55	52.17	74.00	-21.83	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

The data for 18G-25GHz is very low, so not be shown

4. Power Line Conducted Emission

4.1. Test Limits

Frequency	Limits dB(μ V)	
MHz	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

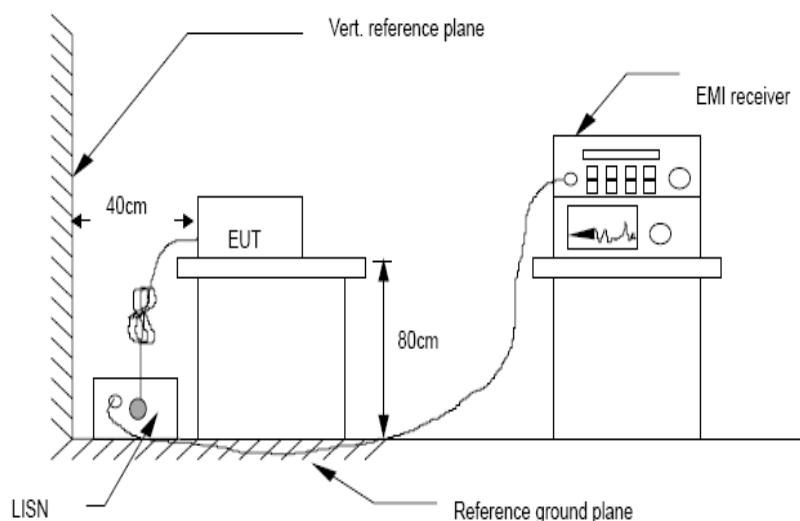
Notes: 1. *Decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies.
 3. The limit decreases in line with the logarithm of the frequency in range of 0.15 to 0.50 MHz.

4.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10:2013 on Conducted Emission Measurement.

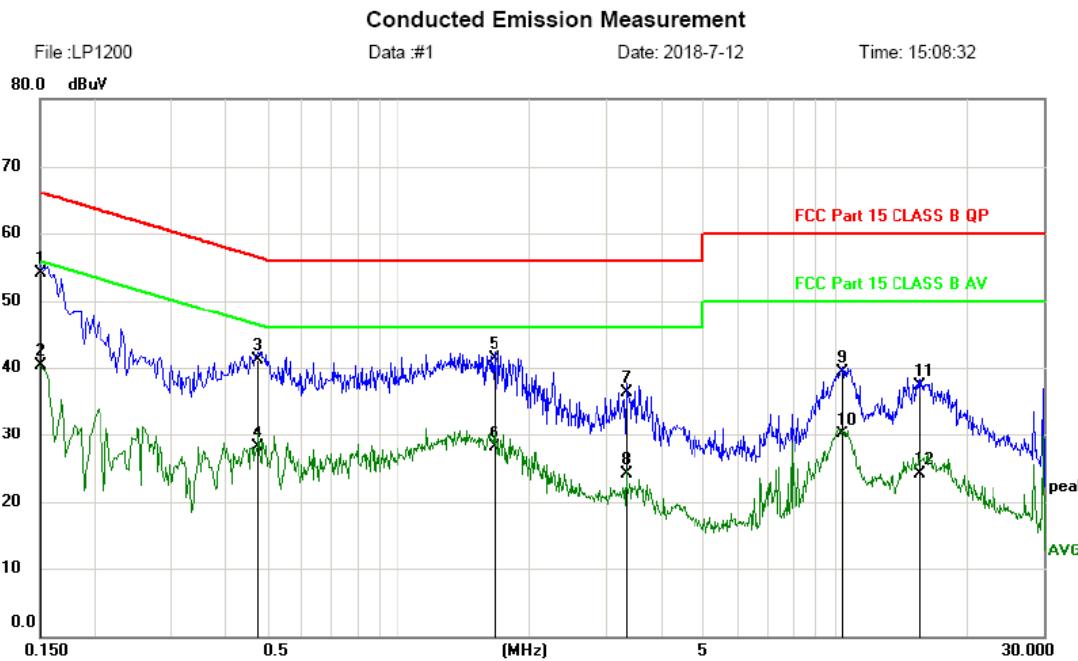
The bandwidth of test receiver is set at 9 kHz.

4.3. Test Setup



4.4. Test Results

N



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV	dB	Detector	
1	*	0.1500	44.38	9.66	54.04	66.00	-11.96	QP
2		0.1500	30.62	9.66	40.28	56.00	-15.72	AVG
3		0.4738	31.34	9.71	41.05	56.45	-15.40	QP
4		0.4738	18.30	9.71	28.01	46.45	-18.44	AVG
5		1.6469	31.44	9.84	41.28	56.00	-14.72	QP
6		1.6469	18.23	9.84	28.07	46.00	-17.93	AVG
7		3.3119	26.28	10.01	36.29	56.00	-19.71	QP
8		3.3119	14.04	10.01	24.05	46.00	-21.95	AVG
9		10.3589	29.01	10.32	39.33	60.00	-20.67	QP
10		10.3589	19.69	10.32	30.01	50.00	-19.99	AVG
11		15.7140	26.85	10.43	37.28	60.00	-22.72	QP
12		15.7140	13.62	10.43	24.05	50.00	-25.95	AVG

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

L

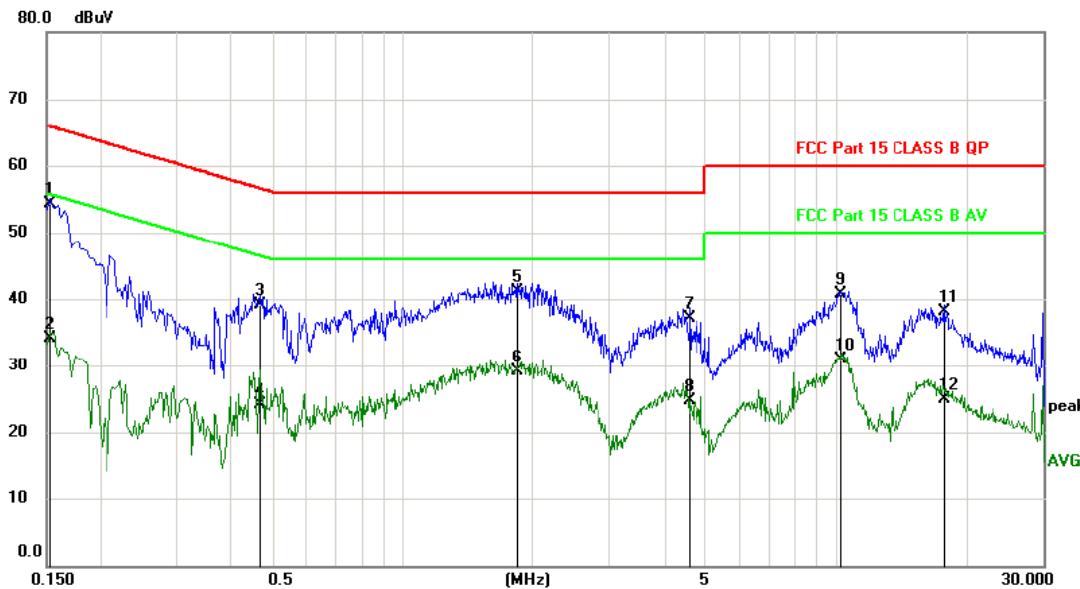
Conducted Emission Measurement

File :LP1200

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Date: 2018-7-12

Time: 15:10:41



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB			
1	*	0.1529	44.62	9.66	54.28	65.84	-11.56	QP	
2		0.1529	24.35	9.66	34.01	55.84	-21.83	AVG	
3		0.4680	29.30	9.71	39.01	56.55	-17.54	QP	
4		0.4680	14.34	9.71	24.05	46.55	-22.50	AVG	
5		1.8300	31.18	9.87	41.05	56.00	-14.95	QP	
6		1.8300	19.20	9.87	29.07	46.00	-16.93	AVG	
7		4.5750	26.89	10.13	37.02	56.00	-18.98	QP	
8		4.5750	14.52	10.13	24.65	46.00	-21.35	AVG	
9		10.2538	30.38	10.33	40.71	60.00	-19.29	QP	
10		10.2538	20.52	10.33	30.85	50.00	-19.15	AVG	
11		17.7118	27.58	10.43	38.01	60.00	-21.99	QP	
12		17.7118	14.42	10.43	24.85	50.00	-25.15	AVG	

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Remark: All modes and channels have been tested and only listed charging+BT link mode that is worst data

5. CONDUCTED MAXIMUM OUTPUT POWER

5.1. Test limits

Please refer section 15.247.

5.2. Test Procedure

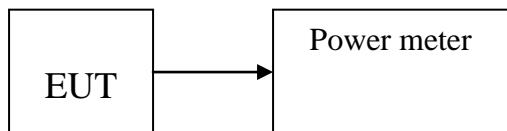
Details see the KDB558074 D01 Meas Guidance V04

5.2.1 Place the EUT on the table and set it in transmitting mode.

5.2.2 Measure out each mode and each bands peak output power of EUT.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

5.3. Test Setup



5.4. Test Results

Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)
CH0	2402	-4.841	0.33	30
CH19	2440	-5.787	0.26	30
CH39	2480	-4.174	0.38	30
Conclusion: PASS				

6. PEAK POWER SPECTRAL DENSITY

6.1. Test limits

6.1.1 Please refer section 15.247.

6.1.2 For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

6.1.3 The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

6.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V04

6.2.1 Place the EUT on the table and set it in transmitting mode.

6.2.2 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

6.2.3 Set the spectrum analyzer as RBW = 3kHz(Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$),
 VBW = 10kHz(Set the VBW $\geq 3 \times \text{RBW}$), span= $1.5 \times \text{DTS bandwidth}$., detail see the test plot.

6.2.4 Record the max reading.

6.2.5 Repeat the above procedure until the measurements for all frequencies are completed.

6.3. Test Setup



6.4. Test Results

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
CH0	2402	-13.756	8	PASS
CH19	2440	-14.091	8	PASS
CH39	2480	-12.837	8	PASS
Conclusion: PASS				

Low channel-2402MHz



Middle channel-2440MHz



High channel-2480MHz



7. BANDWIDTH

7.1. Test limits

Please refer section 15.247

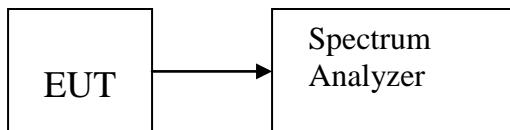
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V04

- a) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver set RBW = 100kHz, VBW $\geq 3 \times \text{RBW}$ = 300kHz, Sweep time set auto, detail see the test plot.

7.3. Test Setup



7.4. Test Results

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
CH0	2402	0.724	0.5	PASS
CH19	2440	0.714	0.5	PASS
CH39	2480	0.716	0.5	PASS

Low channel-2402MHz



Middle channel-2440MHz



High channel-2480MHz



8. BAND EDGE CHECK

8.1. Test limits

Please refer section 15.247.

8.2. Test Procedure

Details see the KDB558074 D01 Meas Guidance V04

8.2.1 Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission

8.2.2 Check the spurious emissions out of band.

8.2.3 Both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure. Test Setup Same as 5.2.2.

8.3. Test Results

We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency.. Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: 1.The amplitude of the spurious emission is more than 20dB above the allowable value, it's considered too low relative to the limit value, no necessary to report.

2. For above 1GHz test, if peak Result comply with AV limit, AV Result is deemed to comply with AV limit, no necessary to report.

Radiated Method: **TX 2402MHz Horizontal**

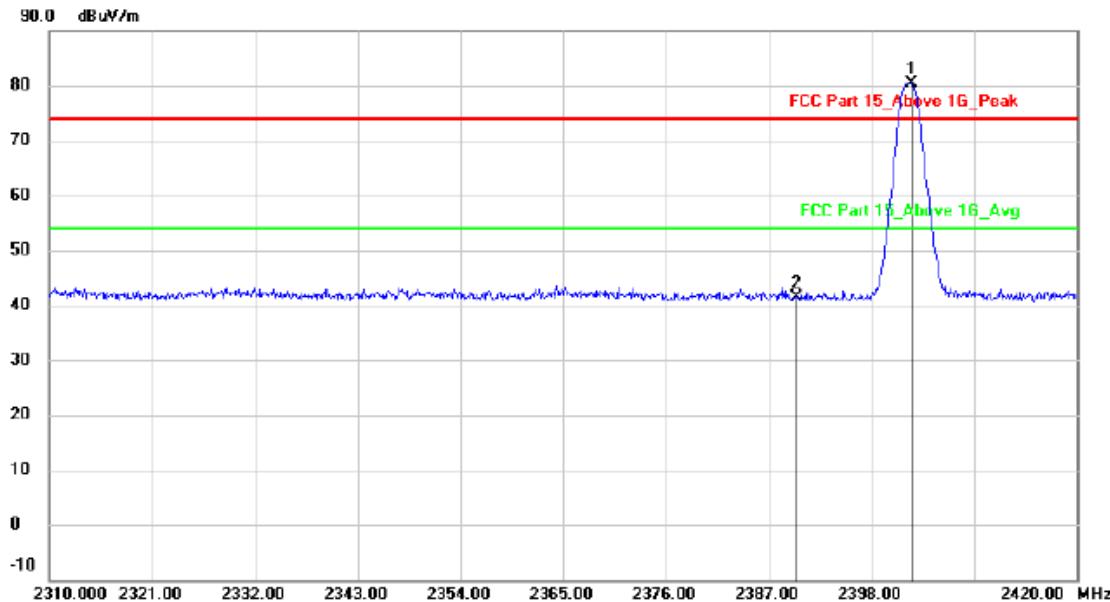
Radiated Emission Measurement

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Data :#5

Date: 2018/7/17

Time: 8:52:13



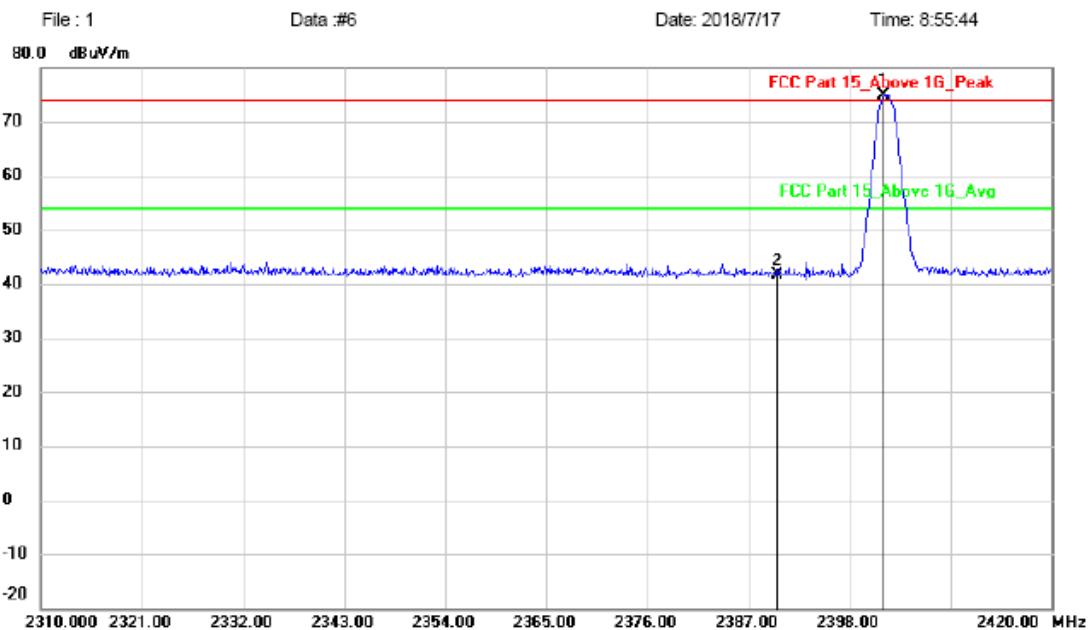
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	2402.290	83.86	-3.41	80.45	74.00	6.45	peak		
2		2390.000	44.68	-3.40	41.28	74.00	-32.72	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX 2402MHz Vertical

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree		
			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2401.740	78.22	-3.41	74.81	74.00	0.81	peak				
2		2390.000	45.11	-3.40	41.71	74.00	-32.29	peak				

Note:1. *:Maximum data; x:Over limit; !:over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX 2480MHz Horizontal

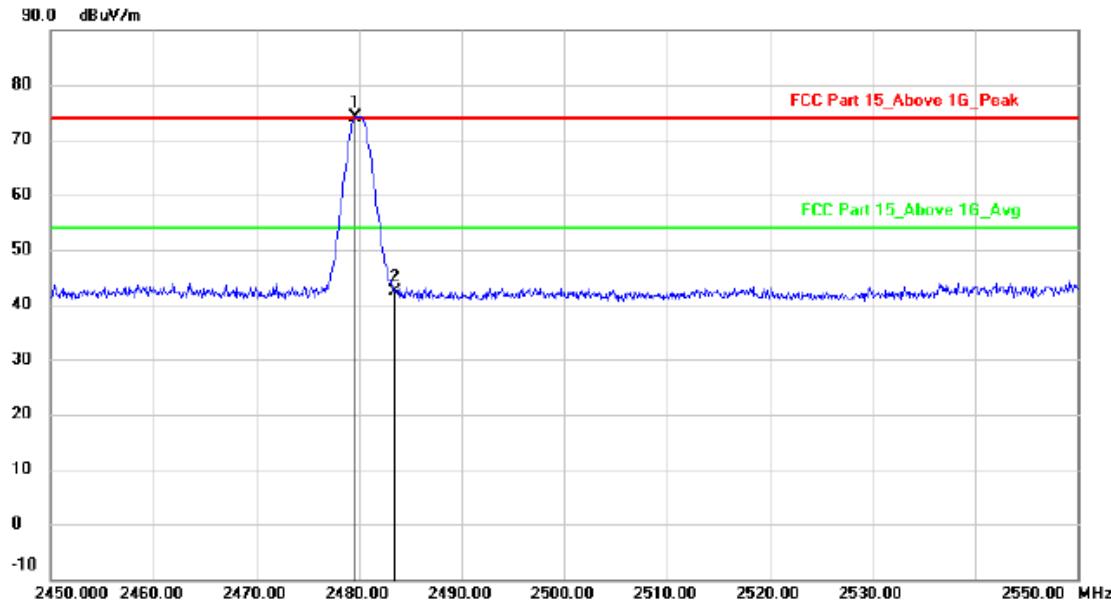
Radiated Emission Measurement

File : 1

Data :#3

Date: 2018/7/17

Time: 8:45:24



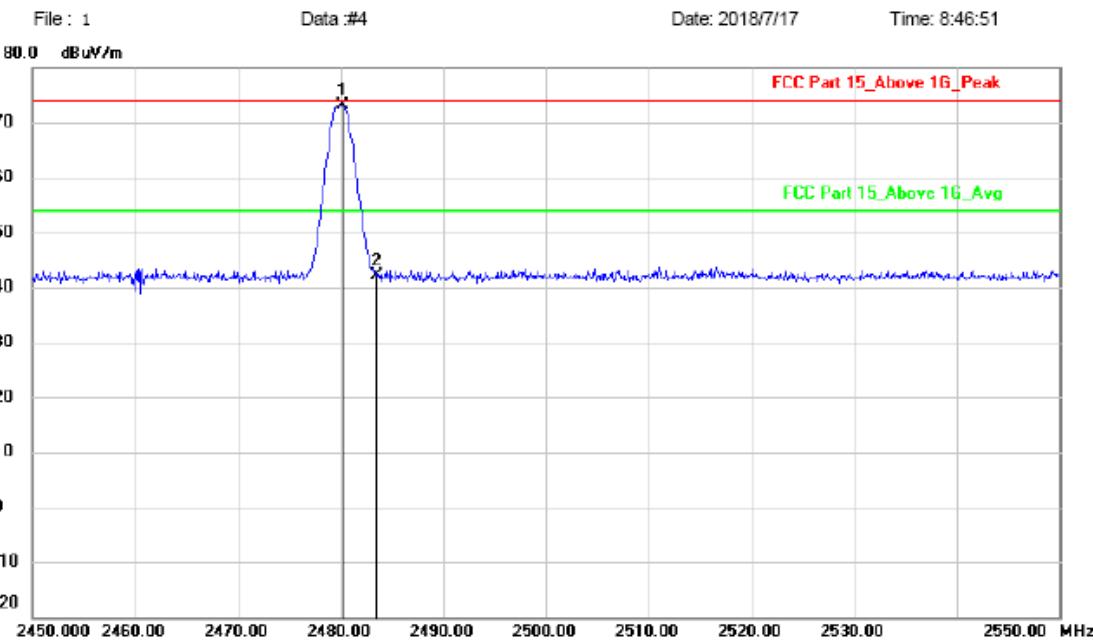
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2479.700	77.52	-3.38	74.14	74.00	0.14	peak			
2		2483.500	45.66	-3.38	42.28	74.00	-31.72	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

TX 2480MHz Vertical

Radiated Emission Measurement



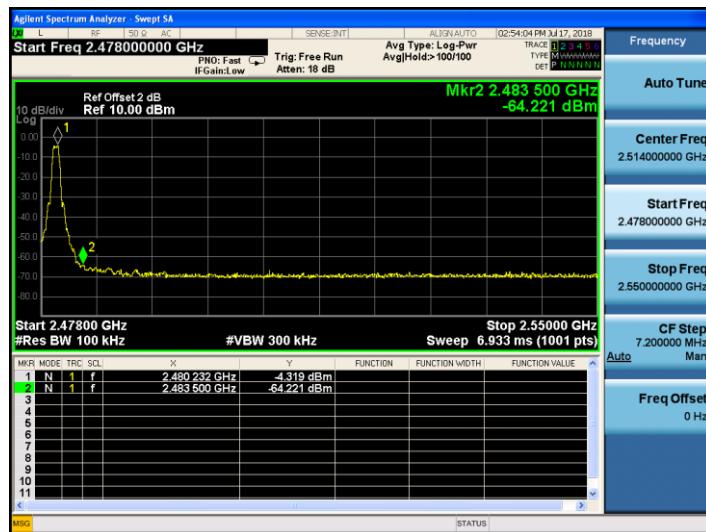
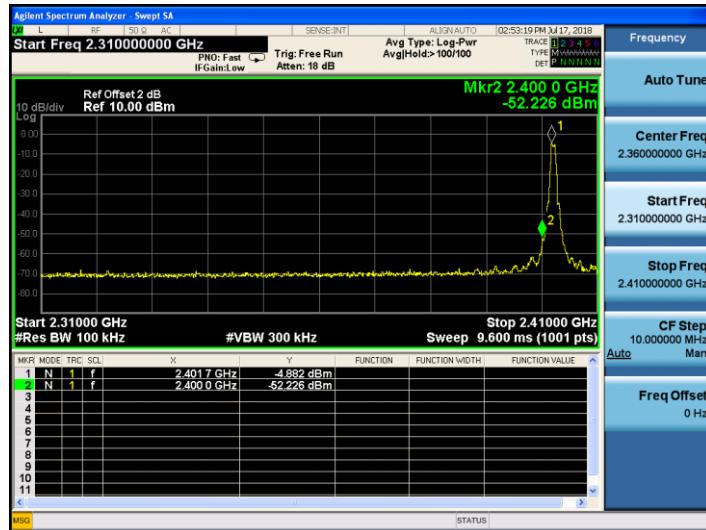
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Antenna Height	Table Degree								
									MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2480.200	76.57	-3.38	73.19	74.00	-0.81	peak									
	2	2483.500	45.41	-3.38	42.03	74.00	-31.97	peak									

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

Conducted Method: GFSK



9. ANTENNA REQUIREMENT

9.1. Standard Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

9.2. Antenna Connected Construction

The antenna is internal antenna and no consideration of replacement. Please see EUT photo for details.

9.3. Results

The EUT antenna is an internal Coaxial Antenna. It complies with the standard requirement.

10. RF EXPOSURE EVALUATION

According to 447498 D01 General RF Exposure Guidance v06

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR, where}$

$f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

Worse case value = $P_{\text{max}} / \text{Distance}_{5\text{mm}} \cdot \sqrt{f(\text{GHz})} = 0.38 / 5 \cdot \sqrt{2.48} = 0.1197 < 3.0$ for 1-g SAR

Then SAR evaluation is not required

-----THE END OF REPORT-----