

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT CLASS II PC REPORT

OF

Product Name: Commissioning Key
Brand Name: Enlighted Inc.
Model No.: CK-1U-01
Model Difference: NA
FCC ID: AQQ-CK1U
Report No.: ER/2017/30078
Issue Date: Apr. 06, 2017
FCC Rule Part: §15.247, Cat: DTS
Prepared for: Enlighted Inc.
 930 Benecia Avenue, Sunnyvale, CA 94085
Prepared by: SGS Taiwan Ltd.
 Electronics & Communication Laboratory
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 Wuku District, New Taipei City, Taiwan 24803



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VERIFICATION OF COMPLIANCE

Applicant: Enlighted Inc.
930 Benecia Avenue, Sunnyvale, CA 94085

Product Name: Commissioning Key

Brand Name: Enlighted Inc.

Model No.: CK-1U-01

Model Difference: NA

FCC ID: AQQ-CK1U

Report Number: ER/2017/30078

Date of test: Mar. 10, 2017~ Mar. 30, 2017

Date of EUT Received: Mar. 10, 2017

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By:

JJ Chen

Date

Apr. 06, 2017

JJ Chen / Engineer

Prepared By:

Stefanie Yu

Date

Apr. 06, 2017

Stefanie Yu / Clerk

Approved By:

Jim Chang

Date

Apr. 06, 2017

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
ER/2017/30078	Rev.00	Initial creation of document	Apr. 06, 2017

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Commissioning Key
Brand Name:	Enlighted Inc.
Marketing Name:	Commissioning Key
Model No.:	CK-1U-01
Model Difference:	NA
Software version:	NA
Hardware version:	NA
Class II Permissive change:	Antenna length in PCB layout; Remove charge & LED functions
Power Supply:	5Vdc from USB port

Zigbee:

Frequency Range:	2405 – 2480MHz
Channel number:	16 channels
Modulation type:	O-QPSK
Transmit Power:	3.56dBm
Antenna Designation:	Printed PIFA Antenna, Peak Gain: 2.8dBi

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1.2 Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is supporting Zigbee features, and below is details of information.

Product Feature	
Product Name:	Commissioning Key
Brand Name:	Enlighted Inc.
Marketing Name:	Commissioning Key
Model No.:	CK-1U-01
Model Difference:	NA
FCC ID:	AQQ-CK1U

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

ANSI C63.10:2013

Note:

1. All test items have been performed and record as per the above standards.

1.4 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory

No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

FCC Registration Numbers are: 509634

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plan. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss 1dB.

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2.5 Configuration of Tested System

Fig. 2-1 Conducted (Antenna Port) & Radiated Emission & Conduction Configuration



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	ZigBee Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L430	LR-7HXZA	Shielded	Unshielded

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

40 channels are provided for Bluetooth LE

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2405 MHz	5	2425 MHz	9	2445 MHz	13	2465 MHz
2	2410 MHz	6	2430 MHz	10	2450 MHz	14	2470 MHz
3	2415 MHz	7	2435 MHz	11	2455 MHz	15	2475 MHz
4	2420 MHz	8	2440 MHz	12	2460 MHz	16	2480 MHz

4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
Zigbee	1 to 16	1,8,16	O-QPSK
RADIATED EMISSION TEST (ABOVE 1 GHz)			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
Zigbee	1 to 16	1,8,16	O-QPSK

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST			
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION
Zigbee	1 to 16	1,8,16	O-QPSK

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : Vertical)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : Horizontal)	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6 PEAK OUTPUT POWER MEASUREMENT

6.1 Standard Applicable:

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

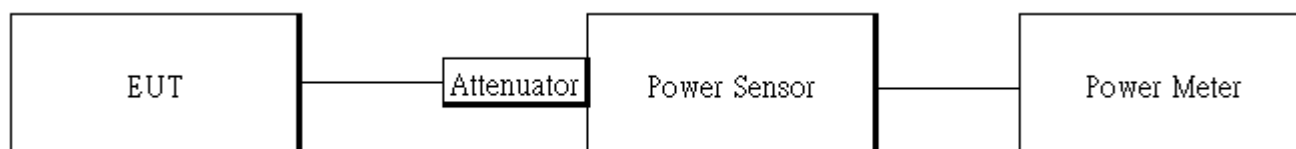
If the transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017

6.3 Test Set-up:



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6.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Power Meter.
5. Repeat above procedures until all test default channel measured was complete.

Measurement Result:

Zigbee mode:

CH	Frequency (MHz)	Peak Power Output (dBm)	Required Limit
11	2405	3.52	1 Watt = 30 dBm
19	2440	3.55	1 Watt = 30 dBm
26	2480	3.56	1 Watt = 30 dBm

Zigbee mode:

CH	Frequency (MHz)	Max. Output include tune up tolerance Power (dBm)	Required Limit
11	2405	0.01	1 Watt = 30 dBm
19	2440	0.35	1 Watt = 30 dBm
26	2480	0.80	1 Watt = 30 dBm

**Note: Measured by power meter, cable loss as 0.45 dB that offsets on the power meter in Peak*

**Note: Measured by power meter, as cable loss+ Duty cycle factor that offsets on the power meter*

**Note: Max. Output Power is average power.*

**Note: Measured by power meter, as cable loss+ Duty cycle factor that offsets on the power meter*

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7 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

7.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

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7.2 Measurement Equipment Used

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/21/2016	04/20/2017
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/05/2017	01/04/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018

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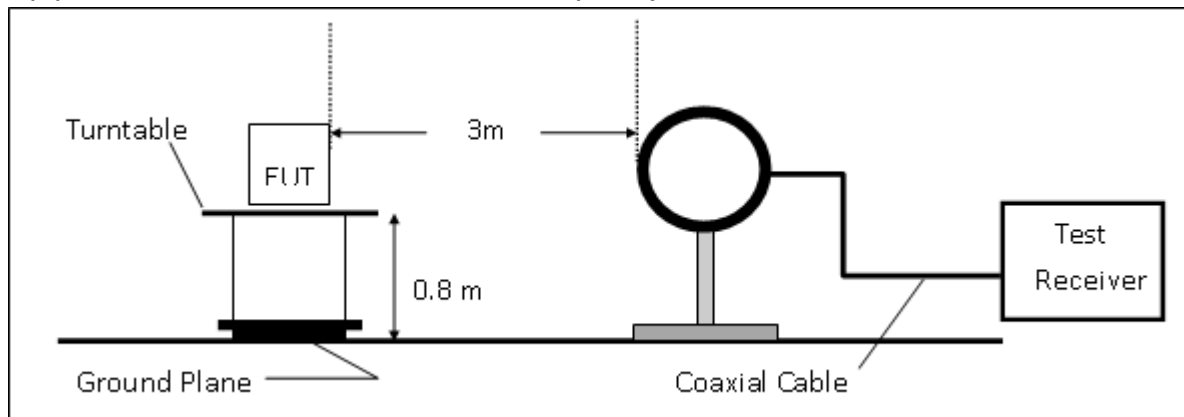
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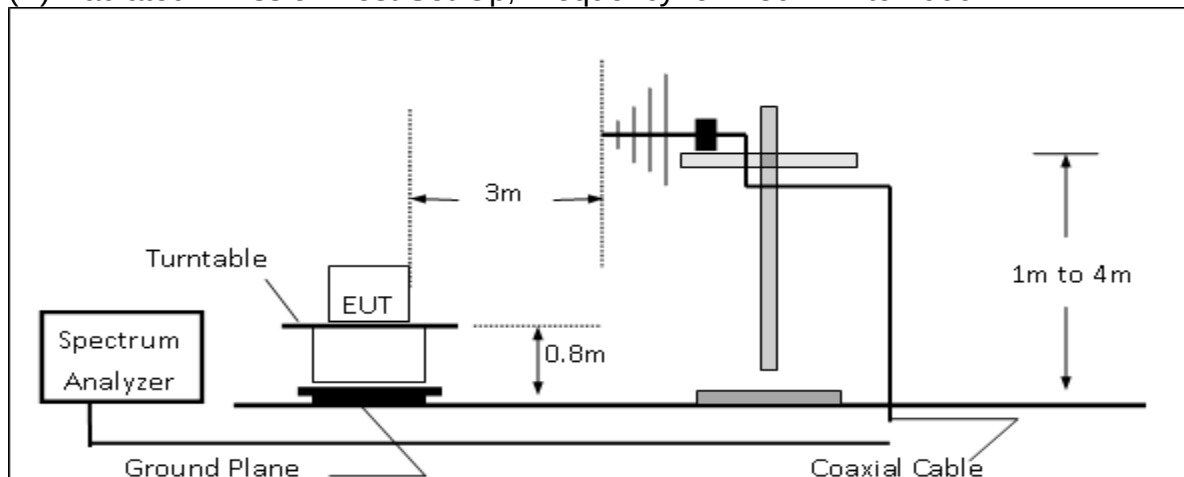
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7.3 Test SET-UP

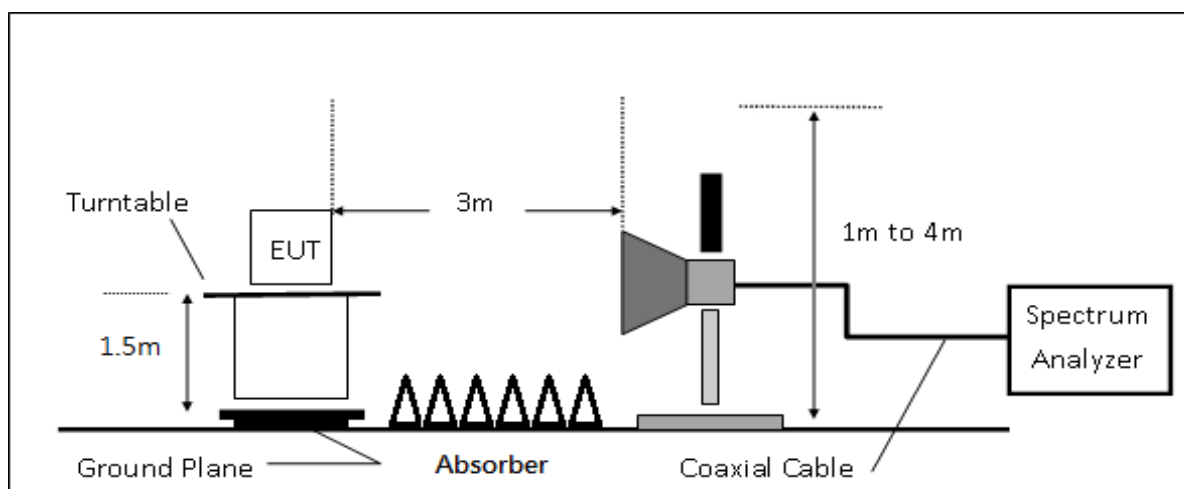
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-UP, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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7.4 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 0.8m for frequency> 1GHz above ground plan.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
8. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
11. Repeat above procedures until all default test channel measured were complete.

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7.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note :

“F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

7.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

7.7 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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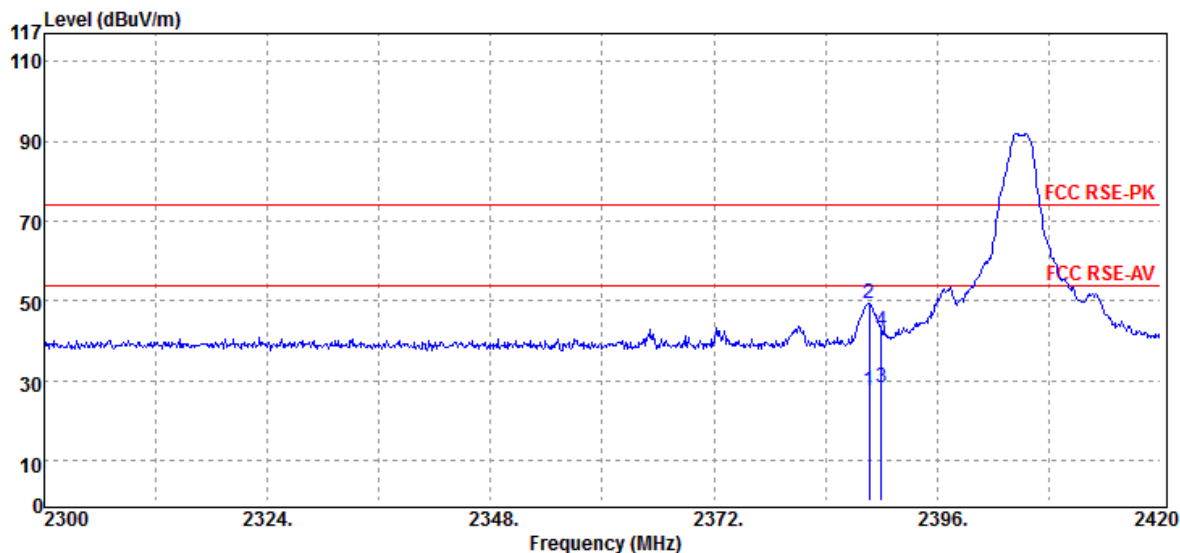
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Radiated Band Edge Measurement Result (Internal Antenna)

Operation Band	: Zigbee	Test Date	: 2017-03-16
Fundamental Frequency	: 2405 MHz	Temp./Humi.	: 21 deg_C / 62 RH
Operation Mode	: Bandedge CH LOW	Engineer	: Tin
EUT Pol.	: E2 Plane	Measurement Antenna Pol.	: VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2388.68	S	Average	29.37	-1.74	27.63	54.00	-26.37
2388.68	S	Peak	51.16	-1.74	49.42	74.00	-24.58
2390.00	E	Average	30.06	-1.74	28.32	54.00	-25.68
2390.00	E	Peak	44.35	-1.74	42.61	74.00	-31.39

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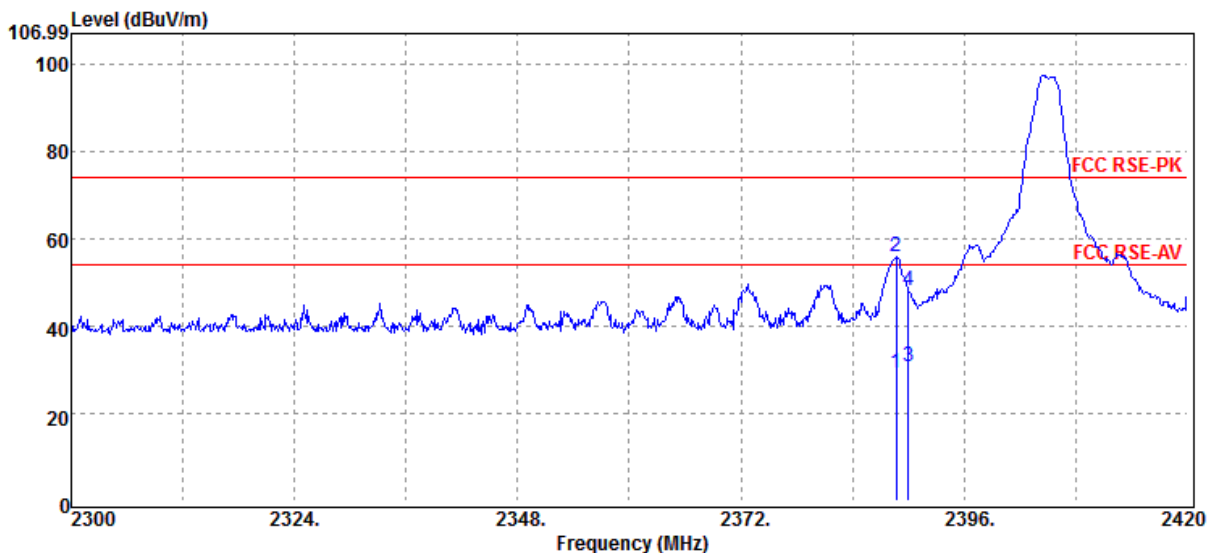
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Operation Band : Zigbee
Fundamental Frequency : 2405 MHz
Operation Mode : Bandedge CH LOW
EUT Pol. : E2 Plane

Test Date : 2017-03-16
Temp./Humi. : 21 deg_C / 62 RH
Engineer : Tin
Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2388.68	S	Average	31.12	-1.74	29.38	54.00	-24.62
2388.68	S	Peak	57.72	-1.74	55.98	74.00	-18.02
2390.00	E	Average	32.41	-1.74	30.67	54.00	-23.33
2390.00	E	Peak	49.85	-1.74	48.11	74.00	-25.89

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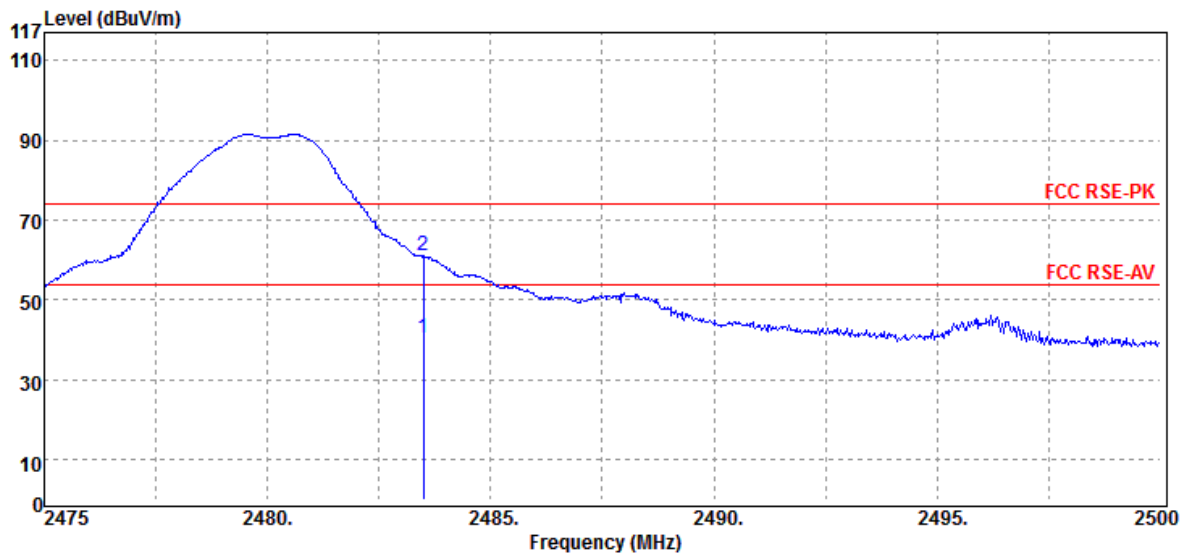
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Operation Band : Zigbee
Fundamental Frequency : 2480 MHz
Operation Mode : Bandedge CH HIGH
EUT Pol. : E2 Plane

Test Date : 2017-03-16
Temp./Humi. : 21 deg_C / 62 RH
Engineer : Tin
Measurement Antenna Pol. : VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	42.20	-1.62	40.58	54.00	-13.42
2483.50	E	Peak	62.56	-1.62	60.94	74.00	-13.06

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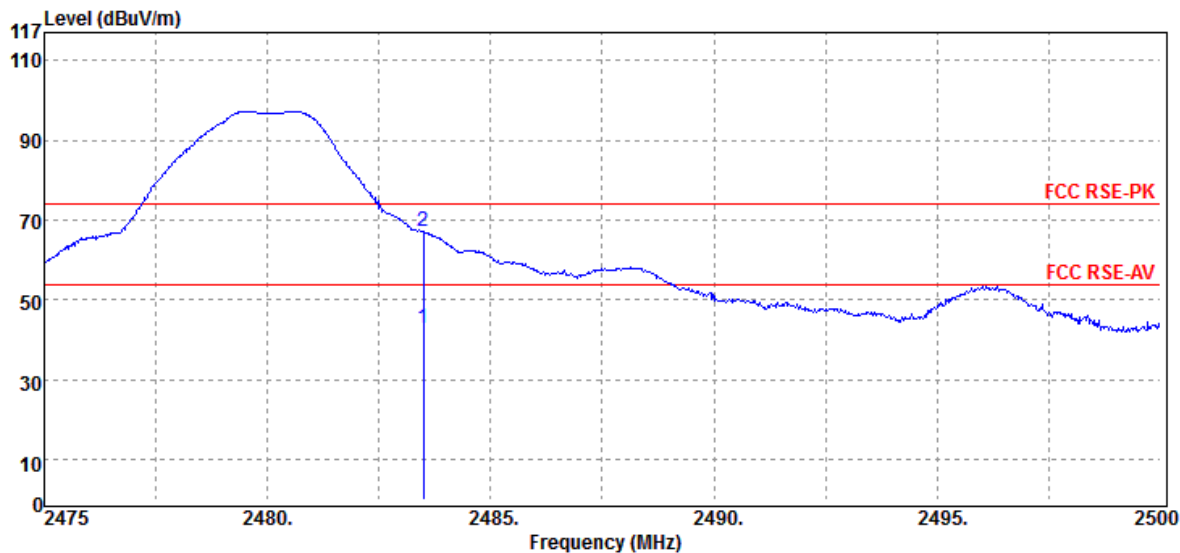
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Operation Band : Zigbee
Fundamental Frequency : 2480 MHz
Operation Mode : Bandedge CH HIGH
EUT Pol. : E2 Plane

Test Date : 2017-03-16
Temp./Humi. : 21 deg_C / 62 RH
Engineer : Tin
Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
2483.50	E	Average	44.57	-1.62	42.95	54.00	-11.05
2483.50	E	Peak	68.67	-1.62	67.05	74.00	-6.95

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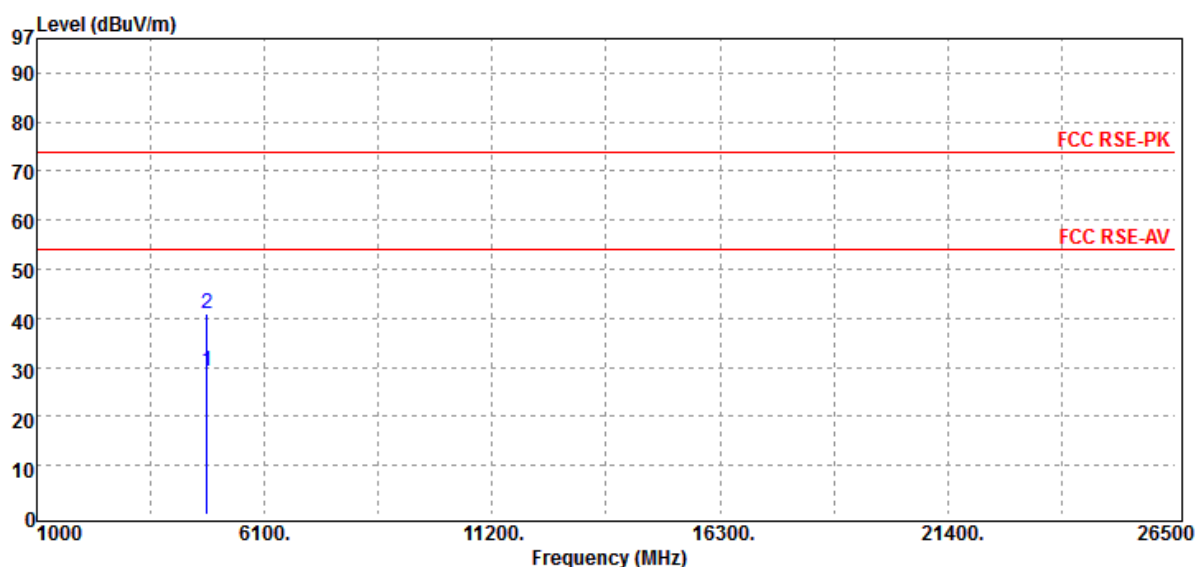
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Radiated Spurious Emission Measurement Result (Internal Antenna) For Frequency above 1GHz

Operation Band	: Zigbee	Test Date	: 2017-03-16
Fundamental Frequency	: 2405 MHz	Temp./Humi.	: 21 deg_C / 62 RH
Operation Mode	: Tx CH LOW	Engineer	: Tin
EUT Pol.	: E2 Plane	Measurement Antenna Pol.	: VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	Margin
		PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4810.00	H	Average	24.29	4.93	29.22	54.00	-24.78
4810.00	H	Peak	36.17	4.93	41.10	74.00	-32.90

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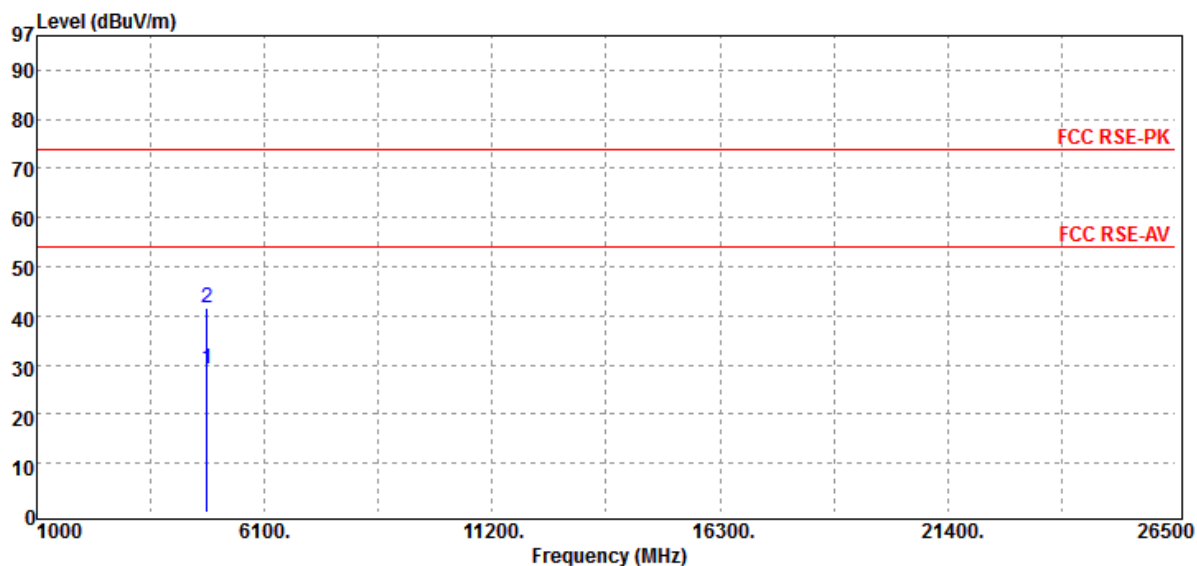
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Operation Band : Zigbee
Fundamental Frequency : 2405 MHz
Operation Mode : Tx CH LOW
EUT Pol. : E2 Plane

Test Date : 2017-03-16
Temp./Humi. : 21 deg_C / 62 RH
Engineer : Tin
Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4810.00	H	Average	24.22	4.93	29.15	54.00	-24.85
4810.00	H	Peak	36.62	4.93	41.55	74.00	-32.45

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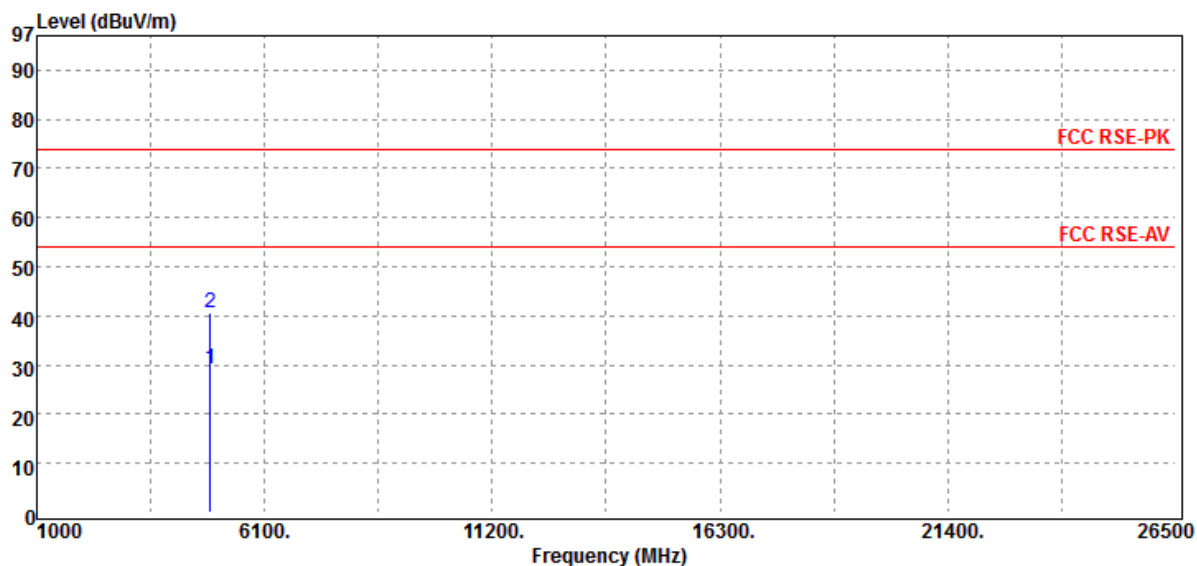
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Operation Band : Zigbee
Fundamental Frequency : 2440 MHz
Operation Mode : Tx CH MID
EUT Pol. : E2 Plane

Test Date : 2017-03-16
Temp./Humi. : 21 deg_C / 62 RH
Engineer : Tin
Measurement Antenna Pol. : VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	Margin
		PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4880.00	H	Average	24.19	5.17	29.36	54.00	-24.64
4880.00	H	Peak	35.57	5.17	40.74	74.00	-33.26

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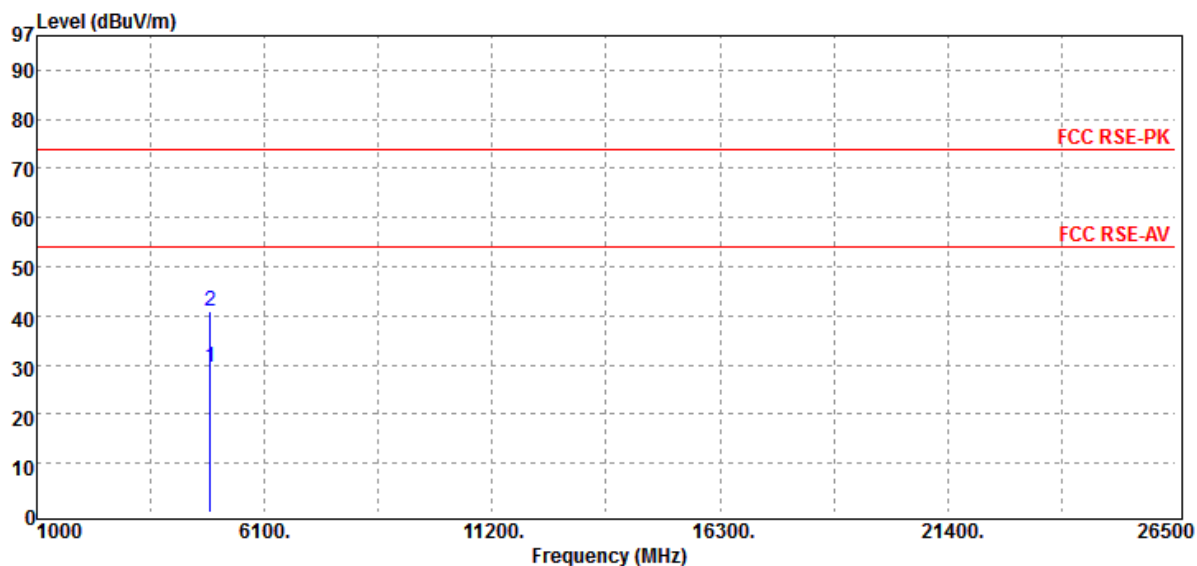
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Operation Band : Zigbee
Fundamental Frequency : 2440 MHz
Operation Mode : Tx CH MID
EUT Pol. : E2 Plane

Test Date : 2017-03-16
Temp./Humi. : 21 deg_C / 62 RH
Engineer : Tin
Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4880.00	H	Average	24.26	5.17	29.43	54.00	-24.57
4880.00	H	Peak	35.78	5.17	40.95	74.00	-33.05

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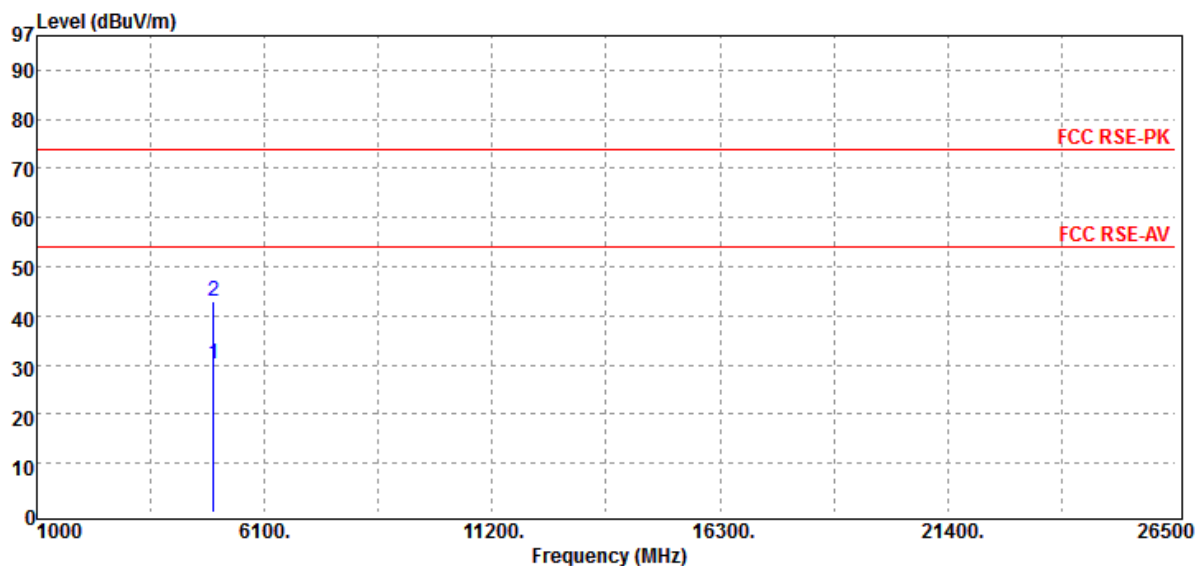
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Operation Band	: Zigbee	Test Date	: 2017-03-16
Fundamental Frequency	: 2480 MHz	Temp./Humi.	: 21 deg_C / 62 RH
Operation Mode	: Tx CH HIGH	Engineer	: Tin
EUT Pol.	: E2 Plane	Measurement Antenna Pol.	: VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level		FS	@3m	Margin
		PK/QP/AV	dB μ V	dB	dB μ V/m	dB μ V/m	dB
4960.00	H	Average	25.01	5.29	30.30	54.00	-23.70
4960.00	H	Peak	37.56	5.29	42.85	74.00	-31.15

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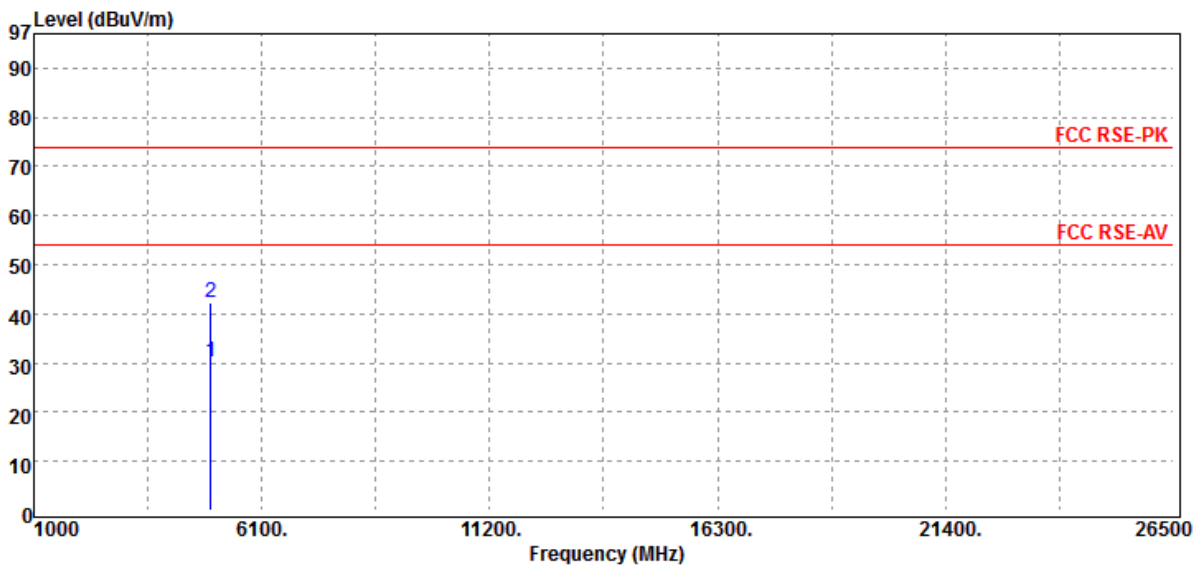
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Operation Band	: Zigbee	Test Date	: 2017-03-16
Fundamental Frequency	: 2480 MHz	Temp./Humi.	: 21 deg_C / 62 RH
Operation Mode	: Tx CH HIGH	Engineer	: Tin
EUT Pol.	: E2 Plane	Measurement Antenna Pol.	: HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
MHz	F/H/E/S	Mode	Reading Level	dB	FS	@3m	Margin
		PK/QP/AV	dBμV		dBμV/m	dBμV/m	dB
4960.00	H	Average	24.93	5.29	30.22	54.00	-23.78
4960.00	H	Peak	37.04	5.29	42.33	74.00	-31.67

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8 ANTENNA REQUIREMENT

8.1 Standard Applicable:

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

In case of point-to-point operation, the power shall be reduced by the one dB for every 3 dB that the directional gain of antenna exceeds 6dBi.

8.2 Antenna Connected Construction:

An embedded-in antenna design is used.

The internal antenna is designed as permanently attached and the external one is designed with a unique connector. There is no consideration of replacement. Please see EUT photo and antenna spec. for details.

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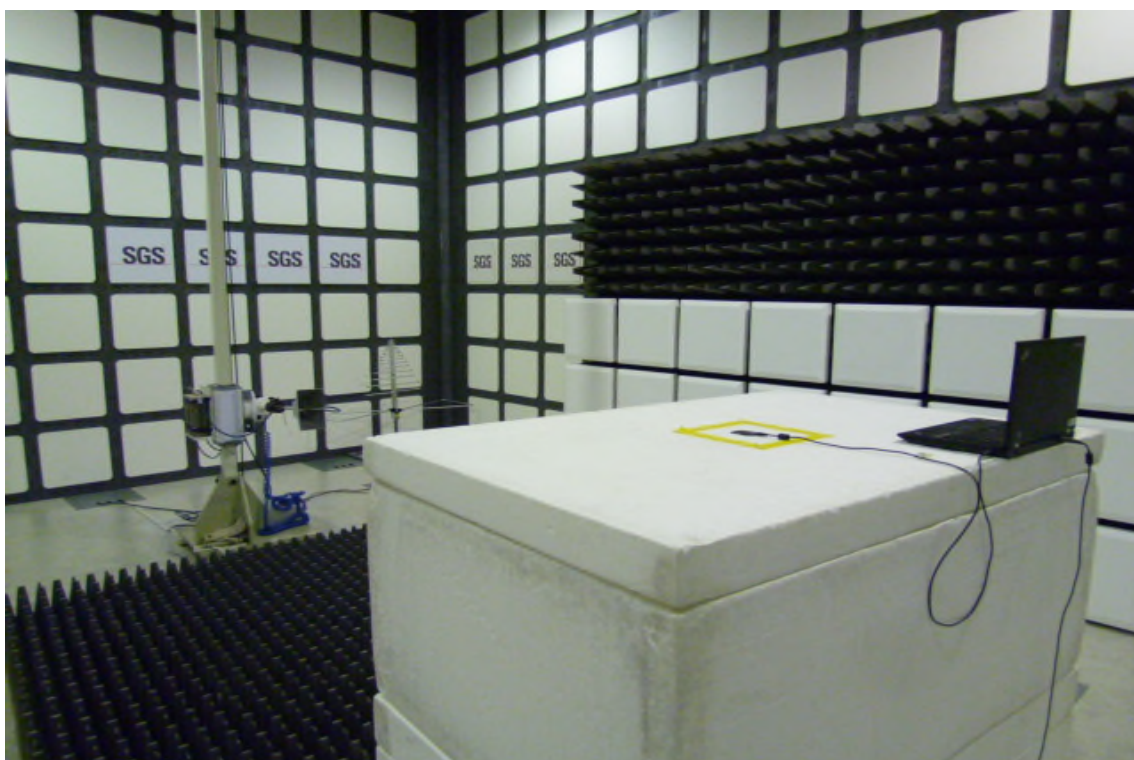
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PHOTOGRAPHS OF SET UP

Radiated Emission Set up Photos (Above 1GHz)



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PHOTOGRAPHS OF EUT

Please refer to the attached file(EUT Photo)

~ End of Report ~

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