

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Applicant: Acer Incorporated
8F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi, New Taipei City
22181, Taiwan (R.O.C)

Product Name: Wireless Charger

Brand Name: 

Model No.: WCMT1005

Model Difference: N/A

Report Number: ER/2018/50046

FCC ID HLZWPC3

FCC Rule Part Part 15C

Issue Date: Jun 01, 2018

Date of Test: May 15, 2018~ May 28, 2018

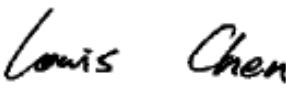
Date of EUT Received: May 15, 2018

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. 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 of FCC Rules Part 15C.

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

Tested By:


Louis Chen

Louis Chen / Engineer

Approved By:


Jim Chang

Jim Chang / Manager



Testing Laboratory
0513

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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2018/50046	Rev.00	Initial creation of document	All	Jun 01, 2018	Stefanie Yu / Clerk

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Wireless Charger
Brand Name:	acer
Model No.:	WCMT1005
Model Difference:	N/A
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	12Vdc

WPC:

Operating Frequency	136 kHz
Transmit Power	75.50 dBuV/m at 3m.
Number of Channels	1
Antenna Type	Loop Antenna
Modulation Type	ASK

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1.2 Test Methodology

FCC Part 15, Subpart C

ANSI C63.10:2013

Note: All test items have been performed and recorded as per the above standards..

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Number and Designation number are: 509634 / TW0001

1.4 Special Accessories

There is no special accessory used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

1.6 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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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

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107. 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 a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m above the reference ground plane. 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.

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Remark 1. Emission level in dBuV/m=20 log (uV/m)

: 2. Measurement was performed at an antenna to the closed point of EUT distance of 3 meters.

3. Distance extrapolation factor = 40 log (required distance/ test distance) (dB);

4. The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement.
Ex. $20 * \log(30) + 40 * \log(30/3) = 69.54$ dBuV/m

5. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of §15.205.

6. The general radiated emission limits in §15.209 apply for the spurious emission generate from UE, except for the fundamental emission where the respective section specifies otherwise.

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2.4 Configuration of Tested System

Fig. 2-1 Emission test set up configuration

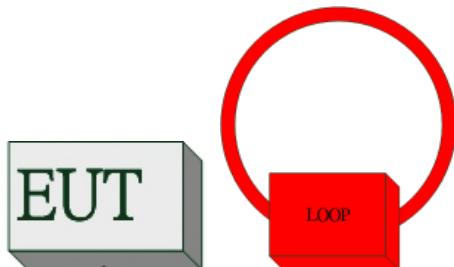


Fig. 2-2 Conduction test set up configuration

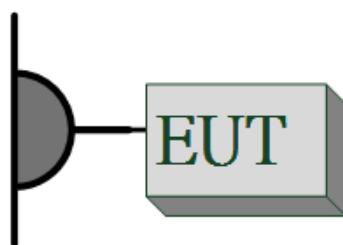


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	NFC Test software	Tera Term	N/A	N/A	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.209	Radiated Emission Limits, general requirement	Compliant
§15.215 (c)	20 dB OCCUPIED BANDWIDTH	Compliant
§15.203	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

The EUT stay in continuous transmitting mode. The frequency 136MHz is the default channel to test, where it is the only manipulative channel as this application supports.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode), the worst case E2 position was reported.

The data rate as the lowest supported is selected while tests are conducted.

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Frequency Stability	+/- 123.36 Hz
20 dB OCCUPIED BANDWIDTH	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty	9kHz - 30MHz: +/- 2.3dB
Measurement uncertainty (Polarization : Vertical)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
Measurement uncertainty (Polarization : Horizontal)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB

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 CONDUCTED EMISSIONS TEST

6.1 Limitation

Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

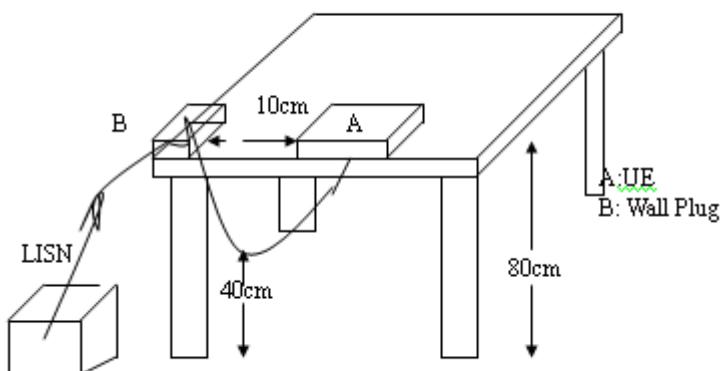
Note

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

6.2 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Sweep frequency starting from 150 kHz to 30 MHz for phase L1.
4. Repeating the measurement as lists above for phase neutral.

6.3 Test SET-UP (Block Diagram of Configuration)



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6.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100335	2018/02/02	2019/2/1
LISN	SCHWARZBECK	NSLK 8127	8127-649	2018/05/18	2019/5/17

6.5 Measurement Result:

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Site Conduction Room
Limit FCC Class B Conduction(QP)
Mode Operation
Note

Phase **L1**
Power AC 120V/60Hz
Temperature: 20 °C
Humidity: 58 %

Conducted Emission



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1660	50.66	0.11	50.77	65.16	-14.39	peak	
2		0.1980	44.64	0.10	44.74	63.69	-18.95	peak	
3		0.5380	41.40	0.09	41.49	56.00	-14.51	QP	
4	*	0.5380	33.90	0.09	33.99	46.00	-12.01	AVG	
5		0.6540	41.72	0.09	41.81	56.00	-14.19	peak	
6		4.2860	34.81	0.18	34.99	56.00	-21.01	peak	
7		26.7060	34.50	0.28	34.78	60.00	-25.22	peak	

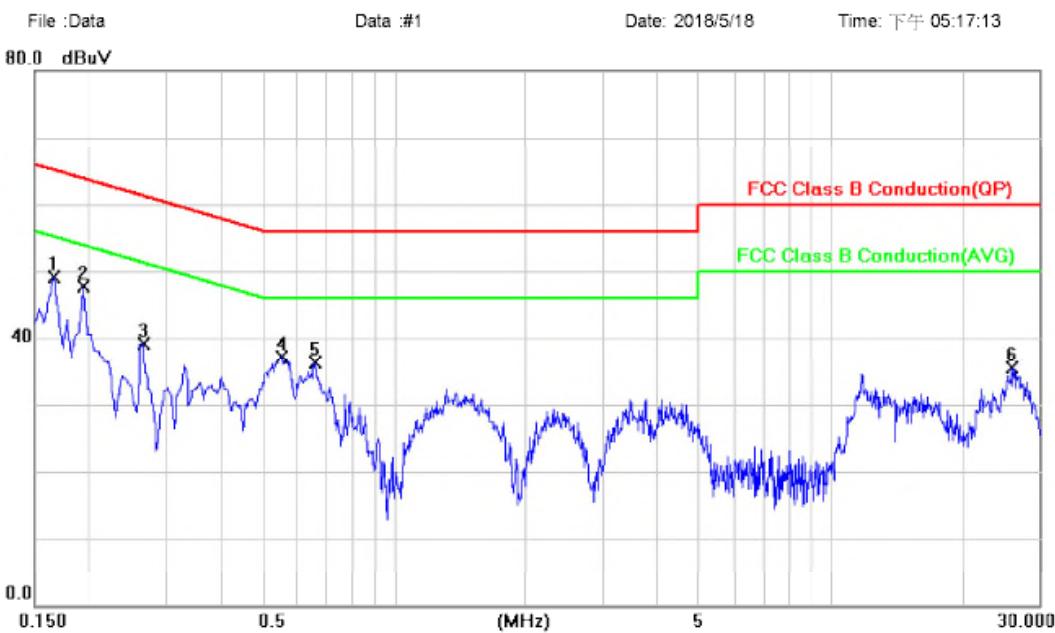
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Site: Conduction Room
Phase: **N**
Temperature: 20 °C
Limit: FCC Class B Conduction(QP)
Power: AC 120V/60Hz
Humidity: 58 %
Mode: Operation
Note:

Conducted Emission



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB	dBuV	dB			
1 *		0.1660	49.03	0.11	49.14	65.16	-16.02	peak	
2		0.1940	47.57	0.10	47.67	63.86	-16.19	peak	
3		0.2660	39.06	0.10	39.16	61.24	-22.08	peak	
4		0.5540	37.11	0.09	37.20	56.00	-18.80	peak	
5		0.6580	36.13	0.09	36.22	56.00	-19.78	peak	
6		26.0580	35.17	0.28	35.45	60.00	-24.55	peak	

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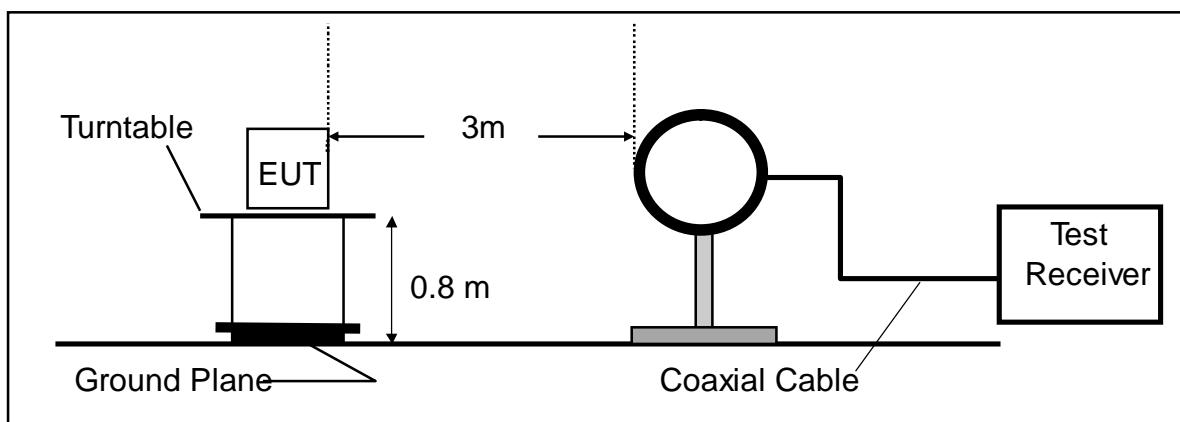
7 RADIATED EMISSION TEST

7.1 Measurement Procedure

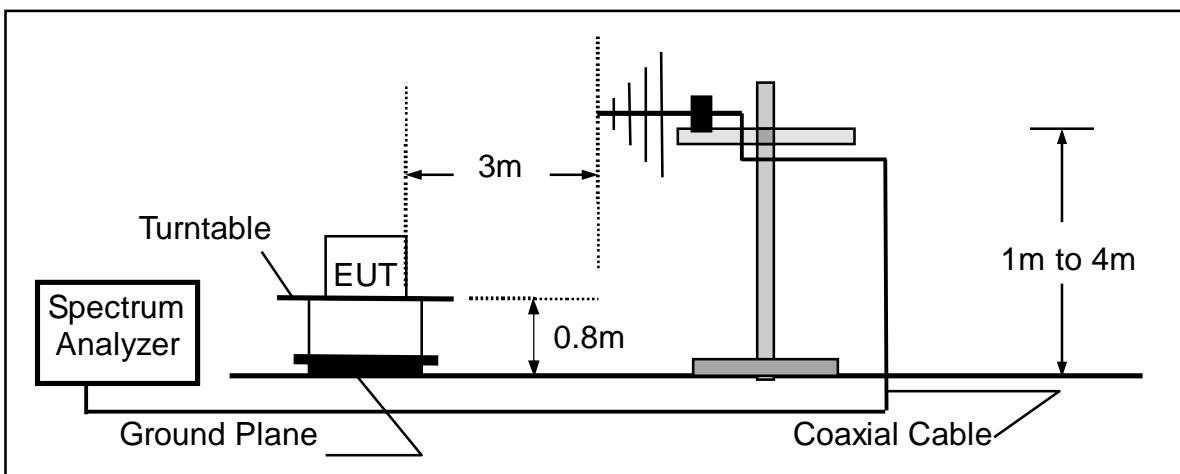
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

7.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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7.3 Measurement Equipment Used:

SGS 966 Chamber No.C

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bi-log Antenna	SCHWAZBEC K	VULB9168	378	2017/12/29	2018/12/28
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2017/08/04	2018/8/3
Horn Antenna	Schwarzbeck	BBHA9170	184	2017/12/12	2018/12/11
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/9/25
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/2/13
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	2018/05/03	2019/5/2
Pre-Amplifier	HP	8449B	3008A00578	2018/01/02	2019/1/1
Pre-Amplifier	HP	8447D	2944A07676	2018/01/02	2019/1/1
Pre-Amplifier	EMC Instruments	EMC184045B	980135	2017/10/27	2018/10/26
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	2018/01/02	2019/1/1
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/1/1

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7.4 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	

7.5 Field Strength of Fundamental Emission

7.5.1 Limit

Below 30MHz

Frequency (MHz)	Limit (μ V/m)	Measurement distance (meters)	Remark
0.009-0.490	2400/F(kHz)	300	Quasi-Peak Value
0.490-1.705	24000/F(kHz)	30	Quasi-Peak Value
1.705-30.0	30	30	Quasi-Peak Value

Above 30MHz

Frequency (MHz)	Limit ($\text{dB}\mu\text{V}/\text{m}$ @3m)	Remark
30-88	40	Quasi-Peak Value
88-216	43.5	Quasi-Peak Value
216-960	46	Quasi-Peak Value
Above 960	54	Quasi-Peak Value
Above 1GHz	54	Average Value
	74	Peak Value

Note:

1. The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement. Ex. $20*\log(30)+40*\log(30/3) = 69.54\text{dB}\mu\text{V}/\text{m}$
2. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
3. Actual $FS(\text{dB}\mu\text{V}/\text{m}) = \text{Spectrum. Reading level}(\text{dB}\mu\text{V}) + \text{Factor}(\text{dB})$
 $\text{Factor}(\text{dB}) = \text{Antenna Factor}(\text{dB}\mu\text{V}/\text{m}) + \text{Cable Loss}(\text{dB}) - \text{Pre}_\text{Amplifier Gain}(\text{dB})$

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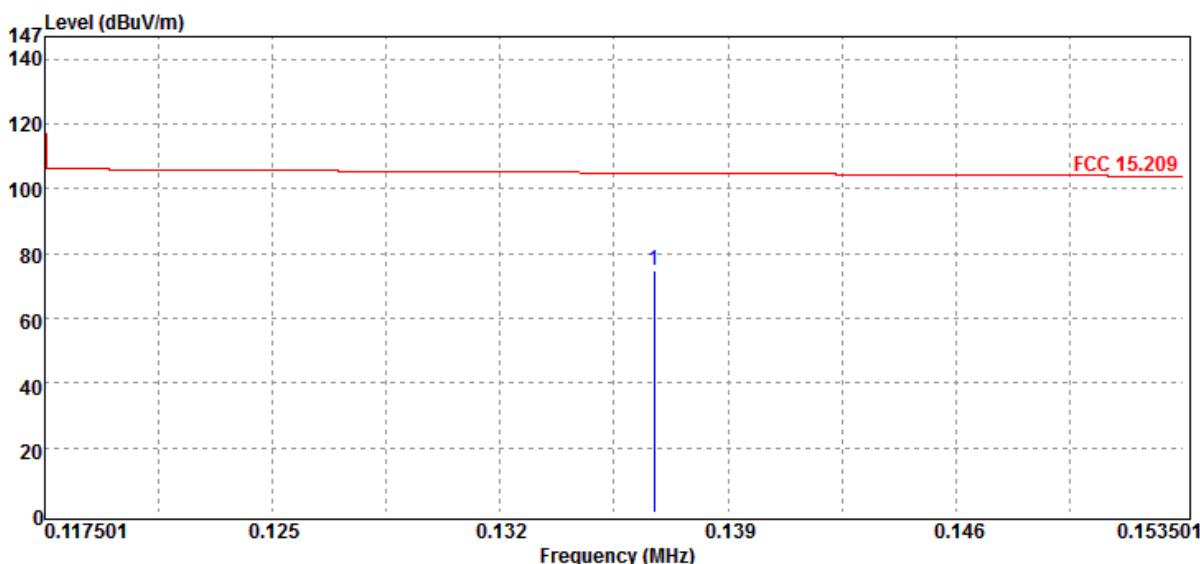
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7.5.2 Below 30 MHz test result

Operation Band :
 Fundamental Frequency :136 KHz
 Operation Mode :Main
 EUT Pol. :E2 Plane

Test Date :2018-05-17
 Temp./Humi. :22 deg_C / 61 RH
 Engineer :Tin
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Safe Margin dB
0.14	F	Peak	63.35	11.38	74.73	104.88	-30.15

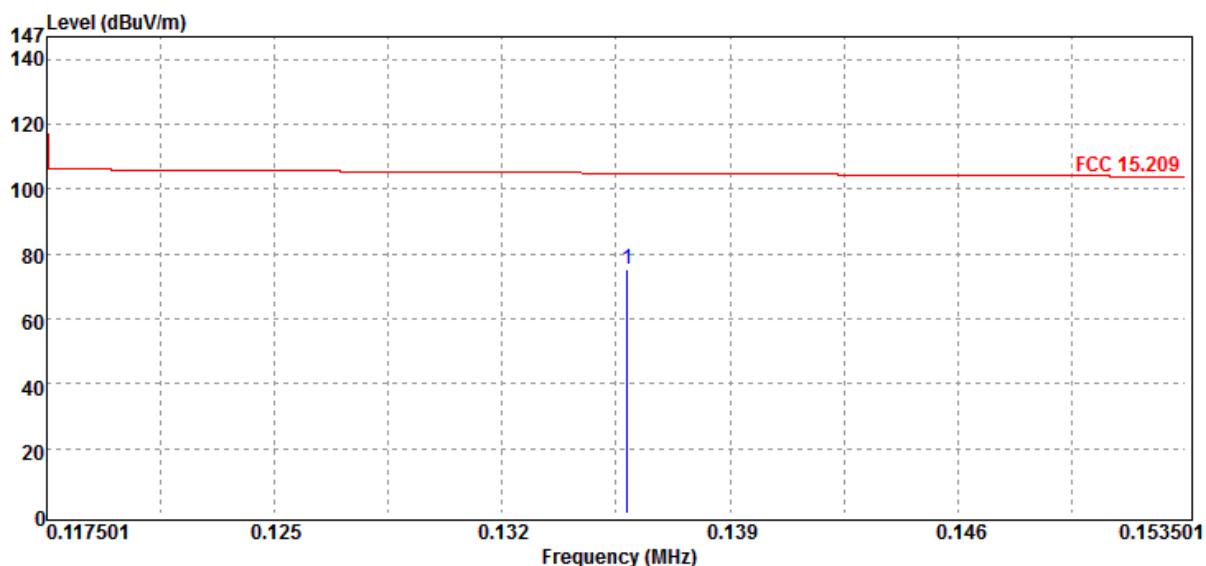
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Operation Band :
 Fundamental Frequency :136 KHz
 Operation Mode :Main
 EUT Pol. :E2 Plane

Test Date :2018-05-17
 Temp./Humi. :22 deg_C / 61 RH
 Engineer :Tin
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Safe Margin dB
0.14	F	Peak	64.12	11.38	75.50	104.94	-29.44

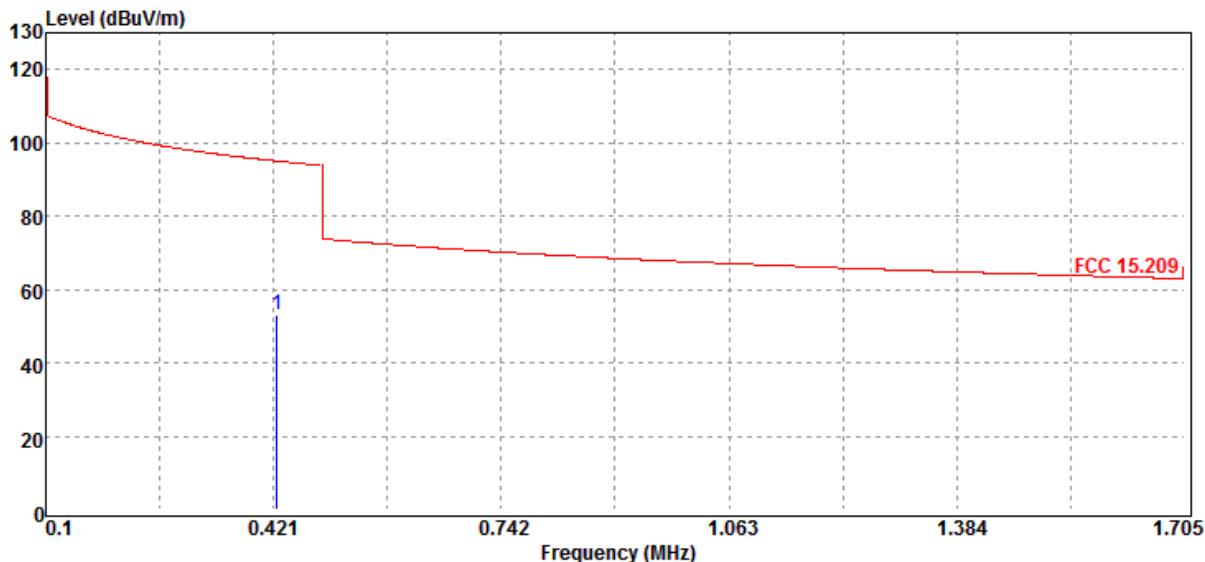
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Operation Band :
 Fundamental Frequency :136 KHz
 Operation Mode :Tx
 EUT Pol. :E2 Plane

Test Date :2018-05-17
 Temp./Humi. :22 deg_C / 61 RH
 Engineer :Tin
 Measurement Antenna Pol. :VERTICAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Safe Margin dB
0.43	H	Peak	42.02	11.21	53.23	95.02	-41.79

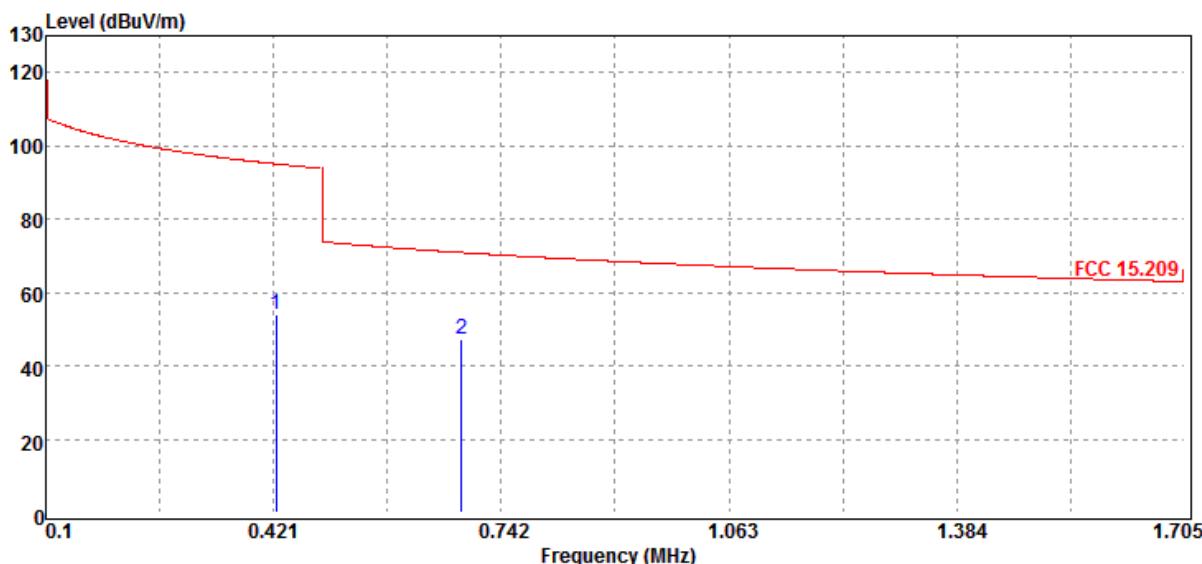
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Operation Band :
 Fundamental Frequency :136 KHz
 Operation Mode :Tx
 EUT Pol. :E2 Plane

Test Date :2018-05-17
 Temp./Humi. :22 deg_C / 61 RH
 Engineer :Tin
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Safe Margin dB
0.42	H	Peak	42.85	11.21	54.06	95.05	-40.99
0.69	H	Peak	35.90	11.29	47.19	70.88	-23.69

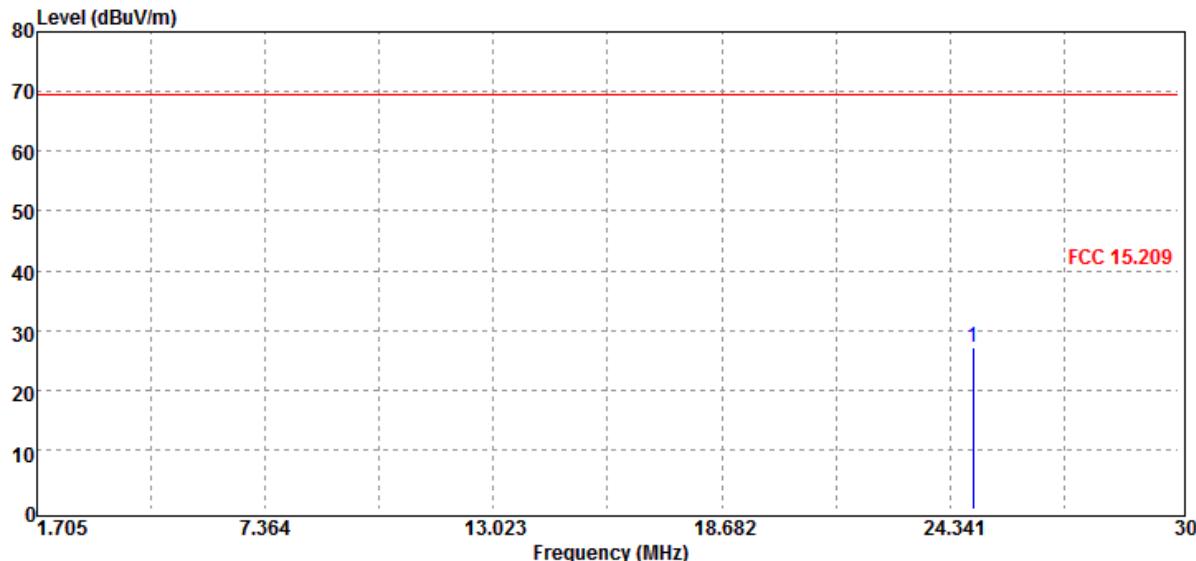
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Operation Band :
 Fundamental Frequency :136 KHz
 Operation Mode :Tx
 EUT Pol. :E2 Plane

Test Date :2018-05-17
 Temp./Humi. :22 deg_C / 61 RH
 Engineer :Tin
 Measurement Antenna Pol. :VERTICAL



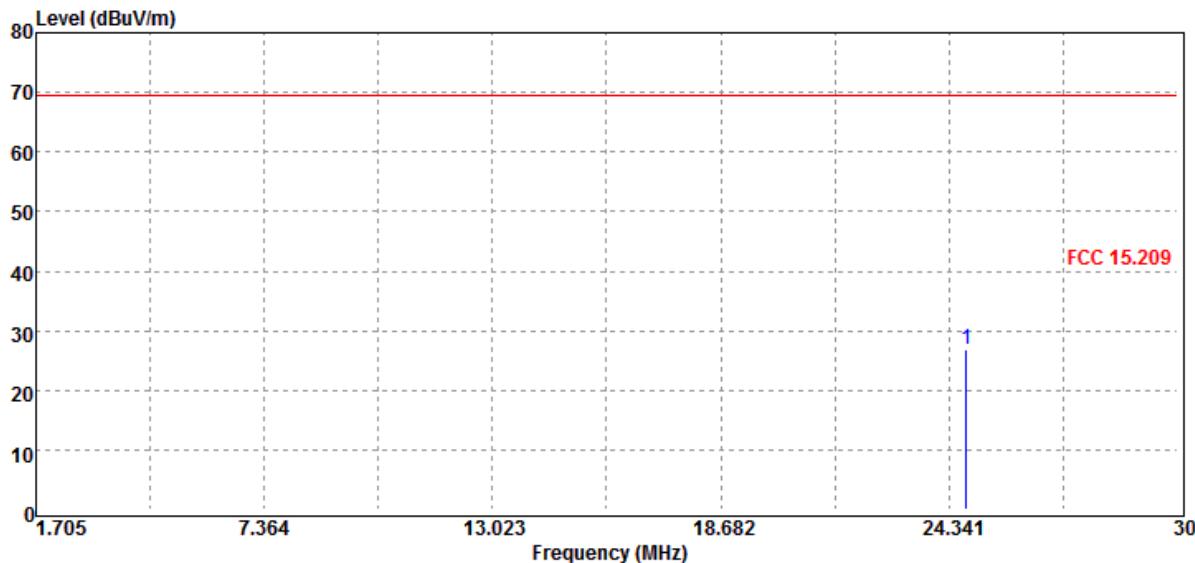
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
24.91	S	Peak	16.63	10.41	27.04	69.54	-42.50

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Operation Band : 2018-05-17
 Fundamental Frequency : 136 KHz Temp./Humi. : 22 deg_C / 61 RH
 Operation Mode : Tx Engineer : Tin
 EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB _μ V	Factor dB	Actual FS dB _μ V/m	Limit @3m dB _μ V/m	Margin dB
24.77	S	Peak	16.44	10.44	26.88	69.54	-42.66

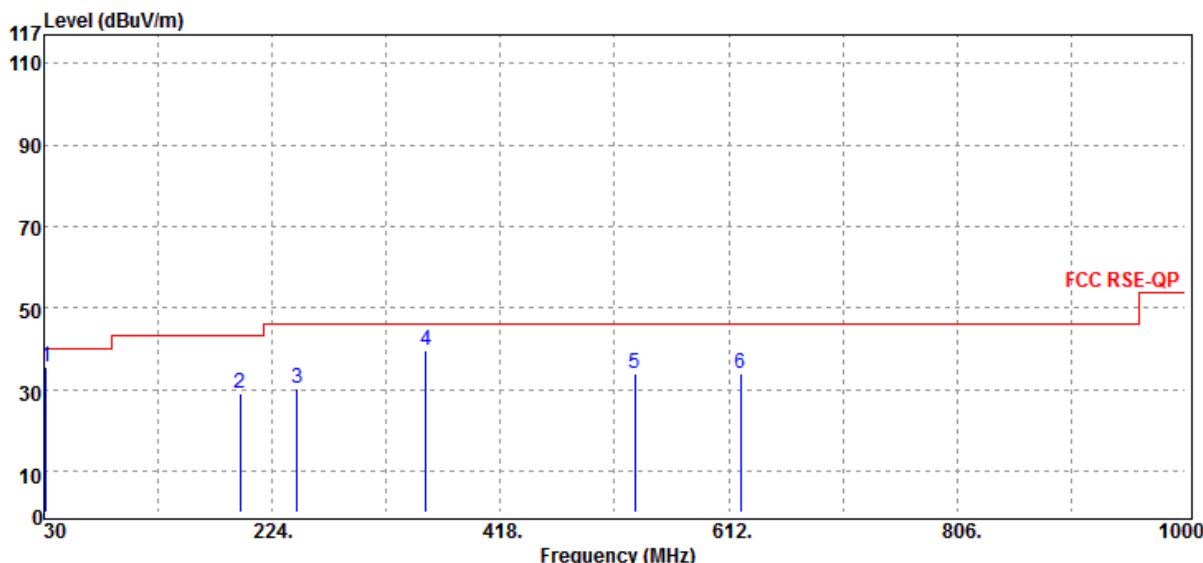
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7.5.3 Above 30MHz test result

Operation Band	:	Test Date	:2018-05-17
Fundamental Frequency	:136 KHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Tx	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
31.94	S	Peak	44.64	-8.88	35.76	40.00	-4.24
196.84	S	Peak	38.19	-9.19	29.00	43.50	-14.50
245.34	S	Peak	37.68	-7.49	30.19	46.00	-15.81
354.95	S	Peak	43.70	-4.18	39.52	46.00	-6.48
532.46	S	Peak	35.63	-1.60	34.03	46.00	-11.97
621.70	S	Peak	33.52	0.47	33.99	46.00	-12.01

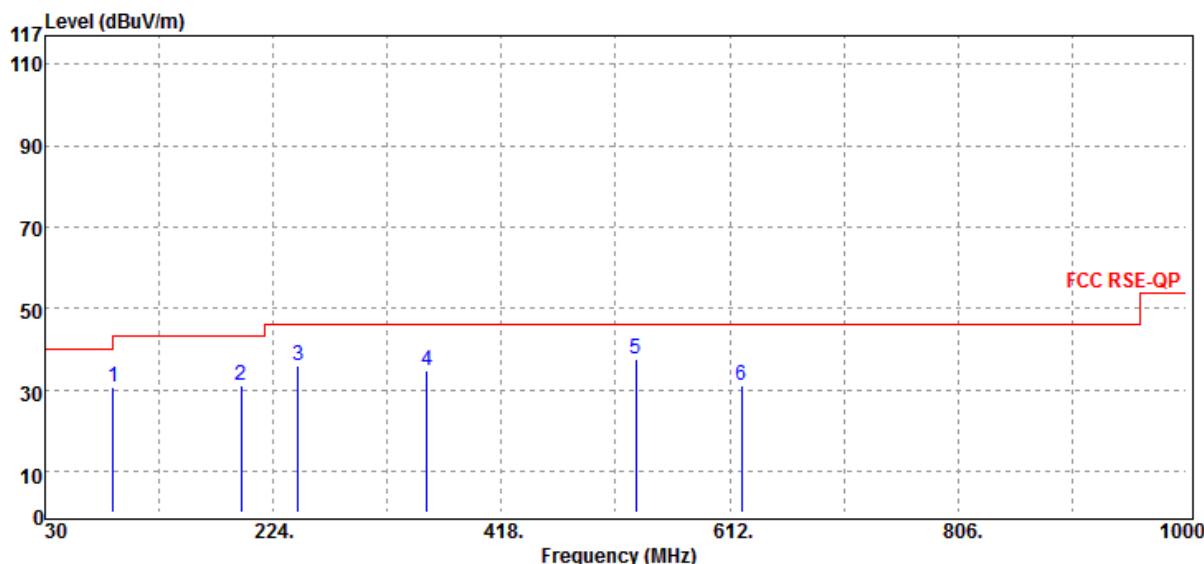
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Operation Band :
 Fundamental Frequency :136 KHz
 Operation Mode :Tx
 EUT Pol. :E2 Plane

Test Date :2018-05-17
 Temp./Humi. :22 deg_C / 61 RH
 Engineer :Tin
 Measurement Antenna Pol. :HORIZONTAL



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
88.20	S	Peak	44.26	-13.39	30.87	43.50	-12.63
196.84	S	Peak	40.17	-9.19	30.98	43.50	-12.52
245.34	S	Peak	43.34	-7.49	35.85	46.00	-10.15
354.95	S	Peak	39.05	-4.18	34.87	46.00	-11.13
532.46	S	Peak	39.19	-1.60	37.59	46.00	-8.41
621.70	S	Peak	30.86	0.47	31.33	46.00	-14.67

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8 20 dB OCCUPIED BANDWIDTH MEASUREMENT

8.1 Standard Applicable:

§2.1049 & §15.215 (c)

8.2 Limit:

None

8.3 Test Set-up

Refer to section 7.2 in this report

8.4 Measurement Procedure

20dB bandwidth

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak mode.
2. 20dB Bandwidth the resolution bandwidth of 200 Hz and the video bandwidth of 10 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.
4. Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

8.5 Measurement Equipment Used:

Refer to section 7.3 in this report

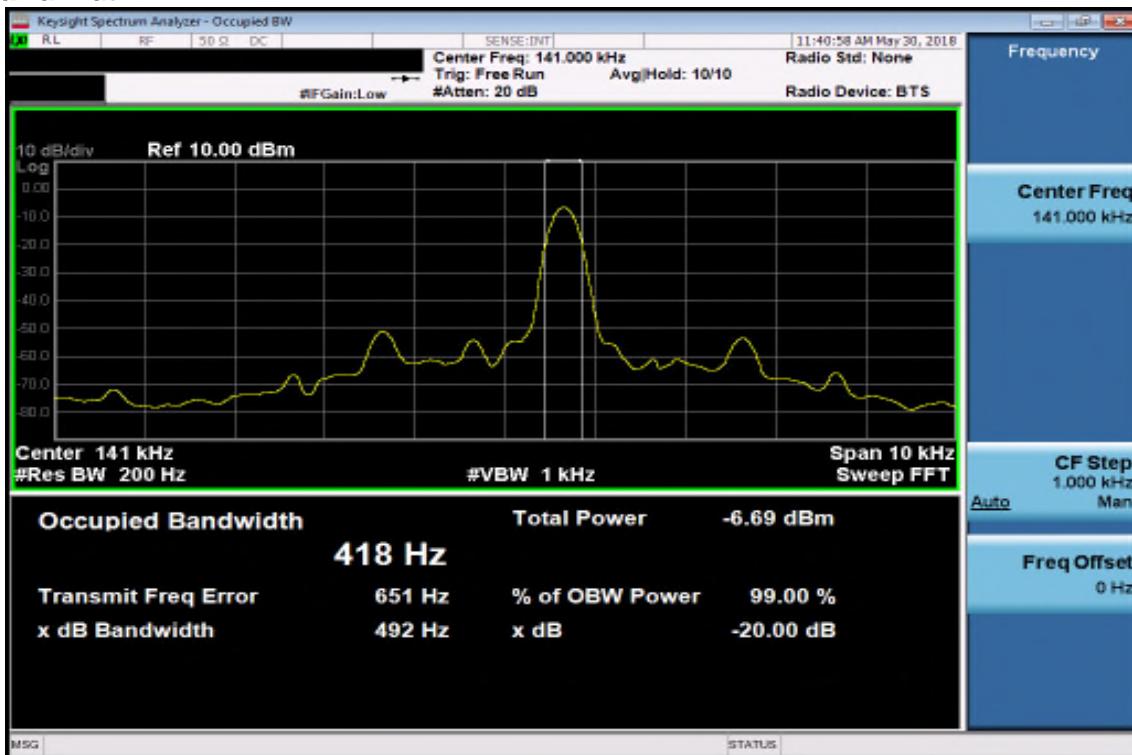
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8.6 Measurement Result

-20dB Bandwidth



20dB Bandwidth	Limit
492 Hz	No requirement

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9 ANTENNA REQUIREMENT

9.1 Standard Applicable:

According to §15.203, Antenna 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

9.2 Antenna Connected Construction:

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~

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