

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C AND INDUSTRY CANADA RSS 210 REQUIREMENT

OF

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

Product Name: Si4455 RF module

Brand Name: acer

Model No.: LS1

Model Difference: N/A

Report Number: T190715W01-RP

FCC ID: HLZLS1

IC: 1754F-LS1

FCC Rule Part: Part 15.231

IC Rule Part: RSS-210 Issue 9 Nov. 2017

Issue Date: Sep. 03, 2019

Date of Test: Jul. 04, 2019 ~ Jul. 30, 2019

Date of EUT Received: Jul. 04, 2019

Note: The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

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

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

Tested By:

Jerry Lu

Jerry Lu / Engineer

Approved By:

Kevin Tsai

Kevin Tsai / Deputy Manager



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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
T190715W01-RP	Rev.00	Initial creation of document	All	Sep. 03, 2019	Elle Chang

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1. GENERAL INFORMATION

1.1 Product Description

Product Name:	Si4455 RF module
Brand Name:	
Model No.	LS1
Model Difference:	N/A
Hardware Version:	N/A
Software Version:	B1A
Power Supply:	3 AAA type batteries: 4.5VDC or USB port: 5VDC from PC

433 MHz:

Operating Frequency	433.5MHz
Transmit Power	≤84.58dBuV/m Max.
Modulation Technique	2FSK
Number of Channels	1 Channel
Antenna Type	Spiral Antenna

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1.2 Test Methodology

FCC Part 15, Subpart C §15.231

RSS-210 Issue 9 2017

ANSI C63.10:2013

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

1.3 Test Facility

Compliance Certification Services Inc. Wugu Lab. No.11, Wugong 6th Rd.,

Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.) (TAF code 1309)

FCC Designation number: TW1309

Canada Registration number: 2324G

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 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

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

The EUT is placed on a 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 §15.207. 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 plane. 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 hand-held 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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2.4 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.

2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

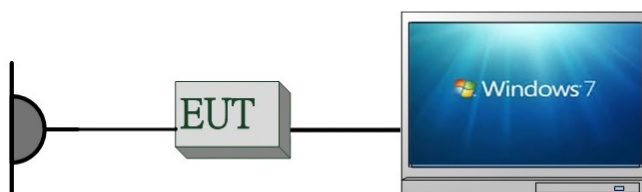


Fig. 2-2 Conduction Emission Configuration

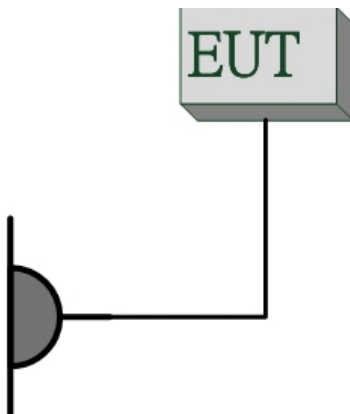


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	Notebook	Lenovo	T440P	PC-089AH5	Shielded	Unshielded
2.	Adapter	SAMSUNG	ETA-U90JWS	RT4D402KS/B	N/A	N/A

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3. SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen § 8.8	AC Power Line Conducted Emission	Compliant
§15.231	RSS-210 A1.2	Radiated Emission	Compliant
§15.231(c)	RSS-210 A1.3	20dB & 99% Occupied Bandwidth	Compliant
§15.35 (c)	RSS-Gen § 6.10	Duty Cycle Test (Pulse Modulation)	Compliant
§15.231(a)(1)	RSS-210 A1.1(b)	Release Time Measurement	Compliant

4. DESCRIPTION OF TEST MODES

4.1 Operated in 433.5MHz Band

1 channel is provided.

CH	FREQUENCY
1	433.500MHZ

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4.2 The Worst Test Modes and Channel Details**AC POWER LINE CONDUCTED EMISSION TEST:**

Test Condition	AC Power line conducted emission for line and neutral
Worst Case	Operation in fully system mode

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Kbps)	ANTENNA PORT
433 MHz	1	1	2FSK	9.6	MAIN
RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Kbps)	ANTENNA PORT
433 MHz	1	1	2FSK	9.6	MAIN

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 433MHz Transmitter for channel Low, Mid and High, the worst case E2 position was reported.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Kbps)	ANTENNA PORT
433 MHz	1	1	2FSK	9.6	MAIN

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5. MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575 dB
Peak Output Power	+/- 1.924 dB
20dB Bandwidth	+/- 147.256 Hz
100 kHz Bandwidth of Frequency Band Edges	+/- 1.924 dB
Frequency Separation	+/- 147.256 Hz
Number of hopping frequency	+/- 147.256 Hz
Time of Occupancy	+/- 147.256 Hz
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12 dB
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68 dB
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18 dB
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47 dB
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81 dB
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87 dB

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.
2. Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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6. CONDUCTED EMISSIONS TEST (NOT APPLY IN THE REPORT)

6.1 Standard Applicable

According to §15.207 and RSS-Gen §8.8 frequency within 150 kHz to 30MHz shall not exceed the limit table as below.

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 Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
CABLE	EMCI	CFD300-NL	CERF	06/29/2019	06/28/2020
EMI Test Receiver	R&S	ESCI	101203	10/29/2018	10/28/2019
LISN	SCHWARZBECK	NSLK 8127	8127-541	01/31/2019	01/30/2020
LISN	SCHAFFNER	NNB 41	03/10013	02/13/2019	02/12/2020
Software	EZ-EMC(CCS-3A1-CE)				

6.3 EUT Setup

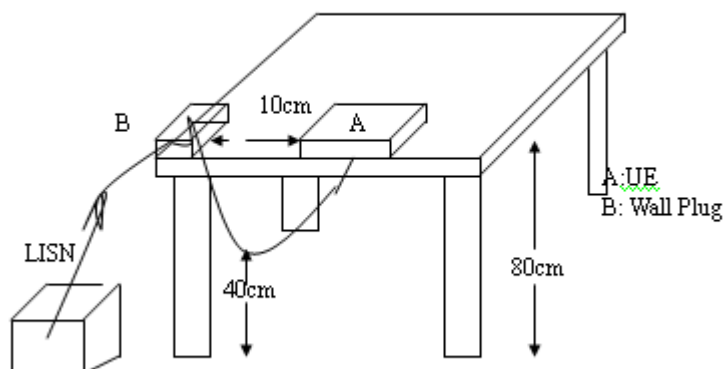
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 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. Repeat above procedures until all frequency measured were complete.

6.6 Measurement Result

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

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

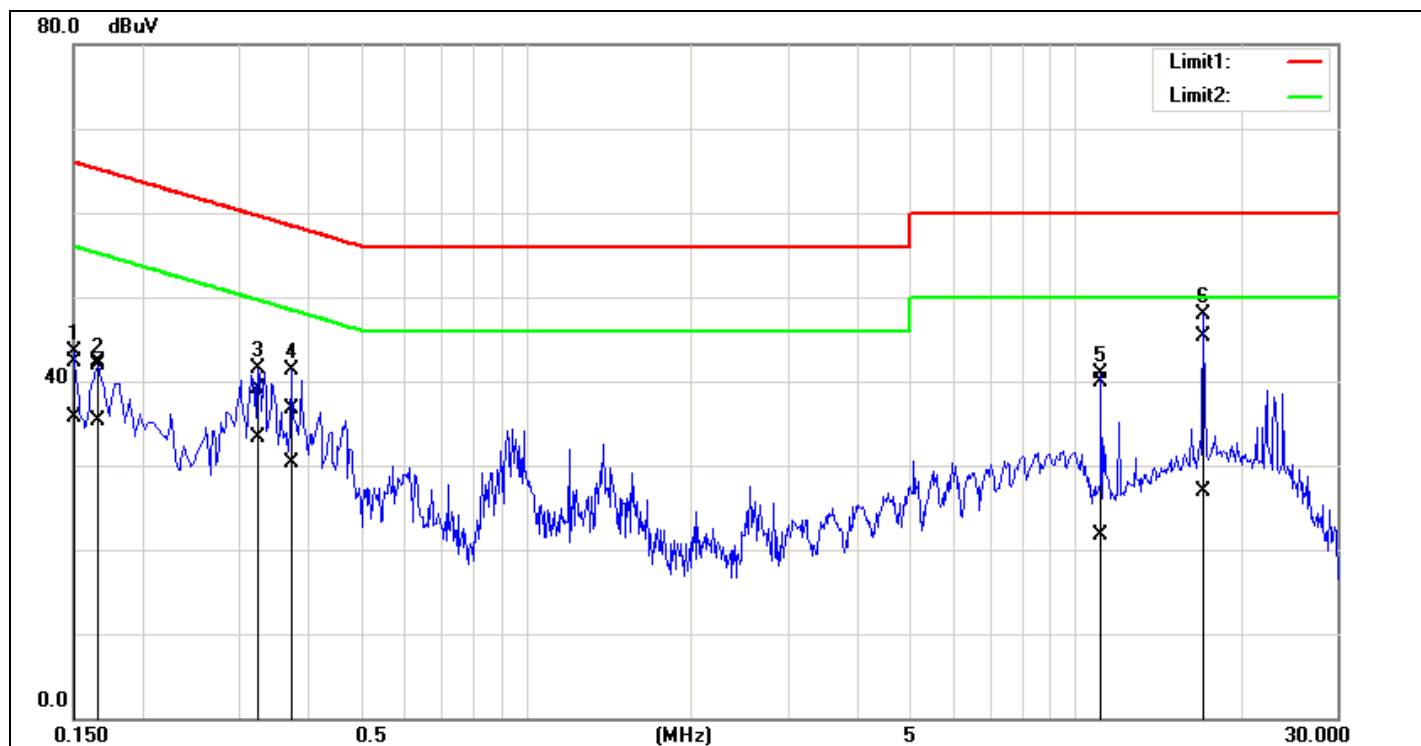
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Description:	Operation	Date:	2019/7/23
Line:	L1	Temp.(°C)/Hum.(%):	25.8(°C)/67%
Test Voltage:	AC 120V/60Hz	Test By:	Gary



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	32.23	25.56	10.14	42.37	35.70	65.99	56.00	-23.62	-20.30	Pass
2	0.1660	32.25	25.26	10.14	42.39	35.40	65.15	55.16	-22.76	-19.76	Pass
3	0.3260	28.95	23.11	10.14	39.09	33.25	59.55	49.55	-20.46	-16.30	Pass
4	0.3740	26.50	20.09	10.14	36.64	30.23	58.41	48.41	-21.77	-18.18	Pass
5	11.1620	29.50	11.31	10.35	39.85	21.66	60.00	50.00	-20.15	-28.34	Pass
6*	17.1259	34.96	16.52	10.37	45.33	26.89	60.00	50.00	-14.67	-23.11	Pass

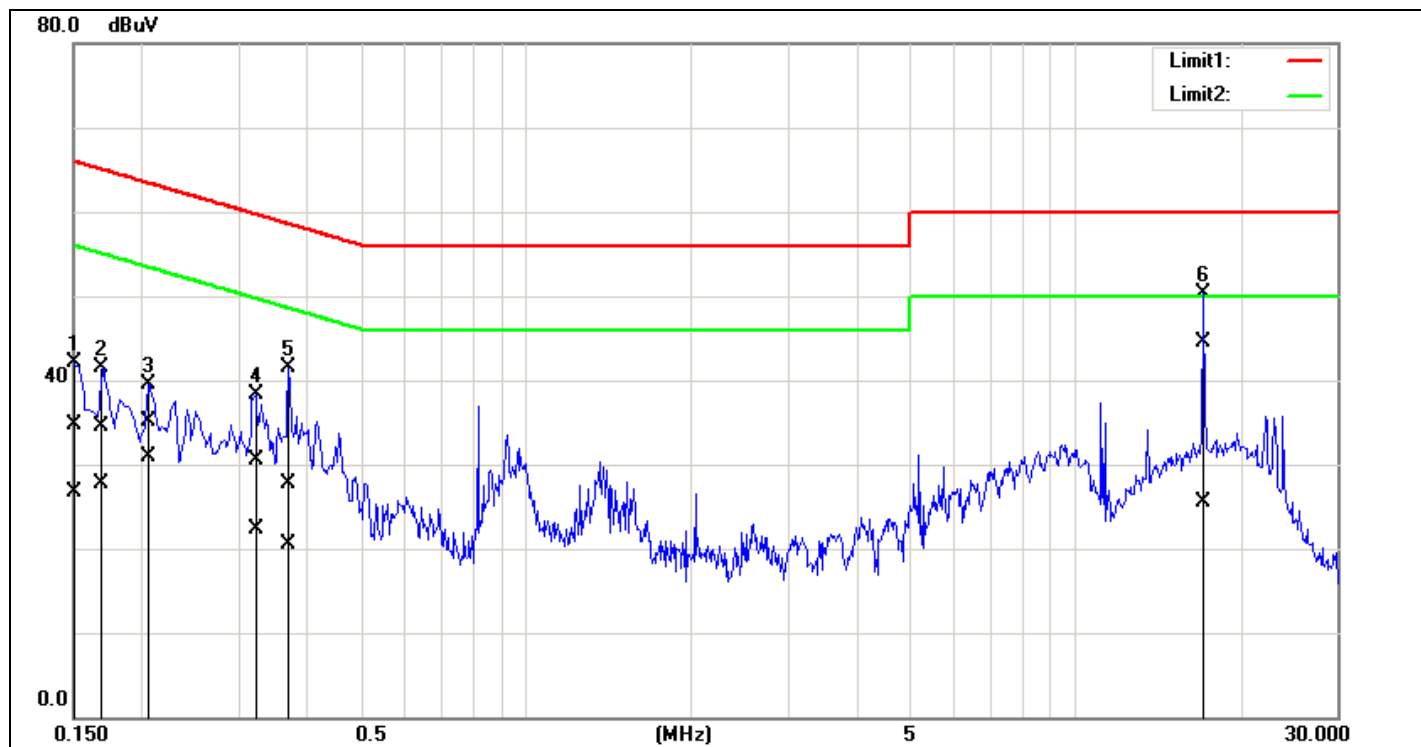
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Description: Operation
Line: N
Test Voltage: AC 120V/60Hz

Date: 2019/7/23
Temp.(°C)/Hum.(%): 25.8(°C)/67%
Test By: Gary



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1500	24.65	16.59	10.02	34.67	26.61	66.00	56.00	-31.33	-29.39	Pass
2	0.1700	24.55	17.71	10.02	34.57	27.73	64.96	54.96	-30.39	-27.23	Pass
3	0.2060	25.09	20.94	10.02	35.11	30.96	63.37	53.37	-28.26	-22.41	Pass
4	0.3220	20.47	12.26	10.03	30.50	22.29	59.66	49.66	-29.16	-27.37	Pass
5	0.3700	17.67	10.40	10.03	27.70	20.43	58.50	48.50	-30.80	-28.07	Pass
6*	17.1260	34.16	15.19	10.26	44.42	25.45	60.00	50.00	-15.58	-24.55	Pass

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7. RADIATED EMISSION TEST

7.1. Standard Applicable:

According to 15.231(b) and RSS 210 A1.2 Table A1, the field strength of emissions from Intentional Radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
40.66 - 40.70	67.04	2,250	47	225
70 - 130	61.94	1,250	41.9	125
130 - 174	* 61.94 - 71.48	* 1,250 - 3,750	* 41.9 - 51.48	* 125 to 375
174 - 260	71.48	3,750	51.48	375
260 - 470	* 71.48 - 81.94	* 3,750 - 12,500	* 51.48 - 54	* 375 to 1250
above 470	81.94	12,500	74	1250

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 meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of §15.205, then the general radiated emission limits in § 15.209 apply.
5. For the band 130-174MHz, uV/m at 3meters = 56.81818(F) – 6136.3636; For the band 260-470MHz uV/m at 3meters = 41.6667(F) – 7083.3333; Where F is the frequency in MHz.
6. 433.00 MHz limit = 41.6667 * 433.00 – 7083.3333= 10958.3478 uV/m = 80.80 dBuV/m
433.75 MHz limit = 41.6667 * 433.75 – 7083.3333= 10989.597825 uV/m = 80.82 dBuV/m
434.525 MHz limit = 41.6667 * 434.525 – 7083.3333= 11021.88952 uV/m = 80.85 dBuV/m

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7.2. Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. 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.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency of the interest measured were complete.

7.3. Auxiliary Procedure (Setting on Spectrum to capture the reading of emission level):

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Test was measured starting from 9kHz to 10th harmonic of the fundamental frequency, and data containing the worst result above 30MHz are shown on the test report.

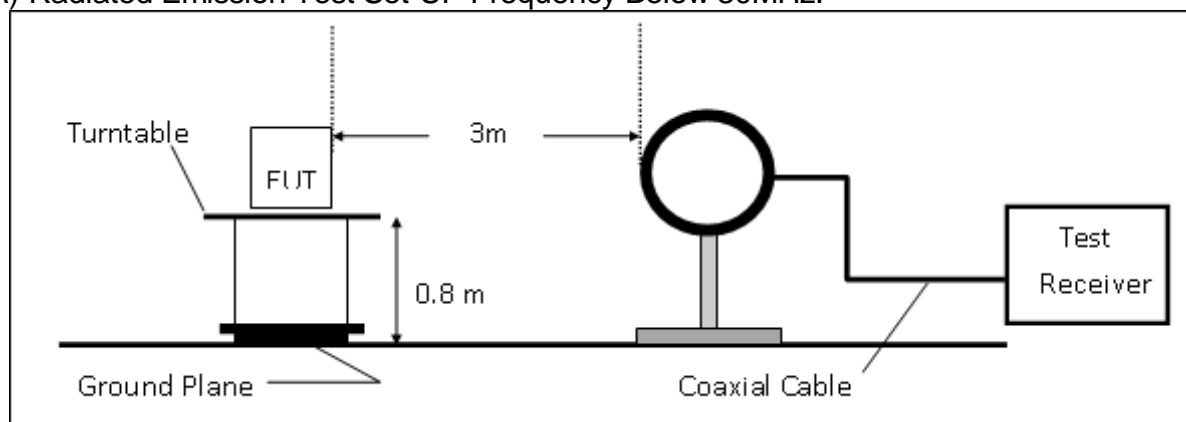
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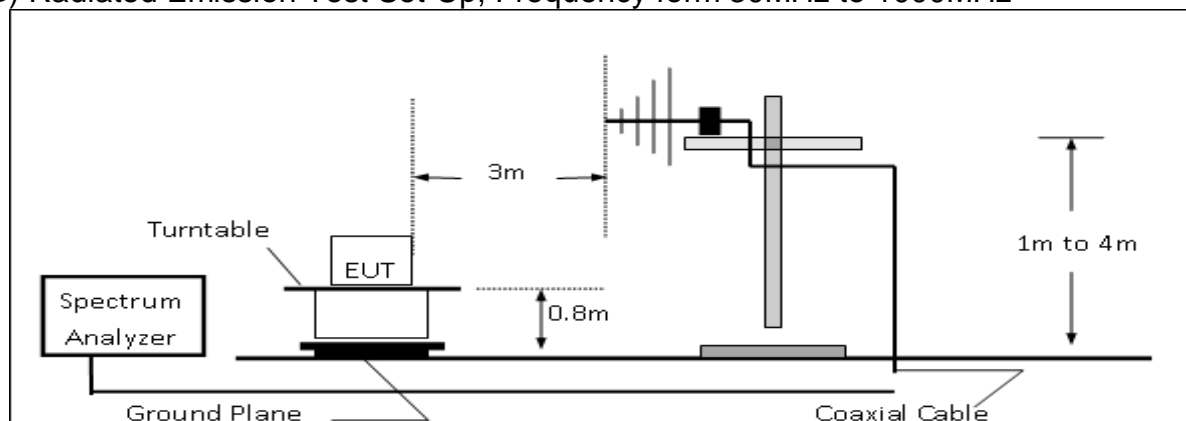
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7.4. Test SET-UP (Block Diagram of Configuration).

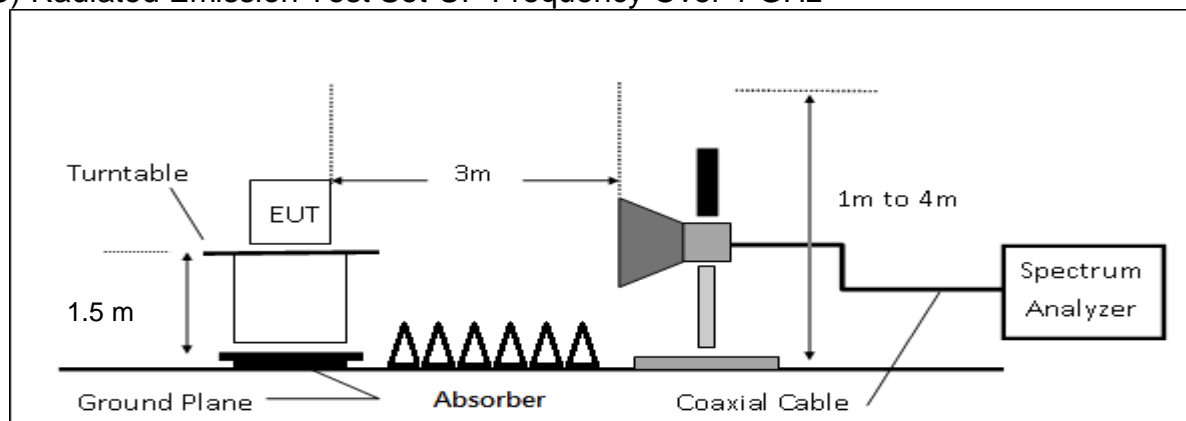
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(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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7.5. Measurement Equipment Used:

966A Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	02/26/2019	02/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	08/20/2018	08/19/2019
High Pass Filter	SOLVANG TECHNOLOGY INC.	STI15	9923	02/26/2019	02/25/2020
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 V6.11-20180413				

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7.6. 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	

Remark:

The limit of the emission level is expressed in dBuV/m, which converts $20 \cdot \log(\mu V/m)$

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

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

7.7. 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) and RSS-Gen § 6.13 was not reported.

7.8. Measurement Result:

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

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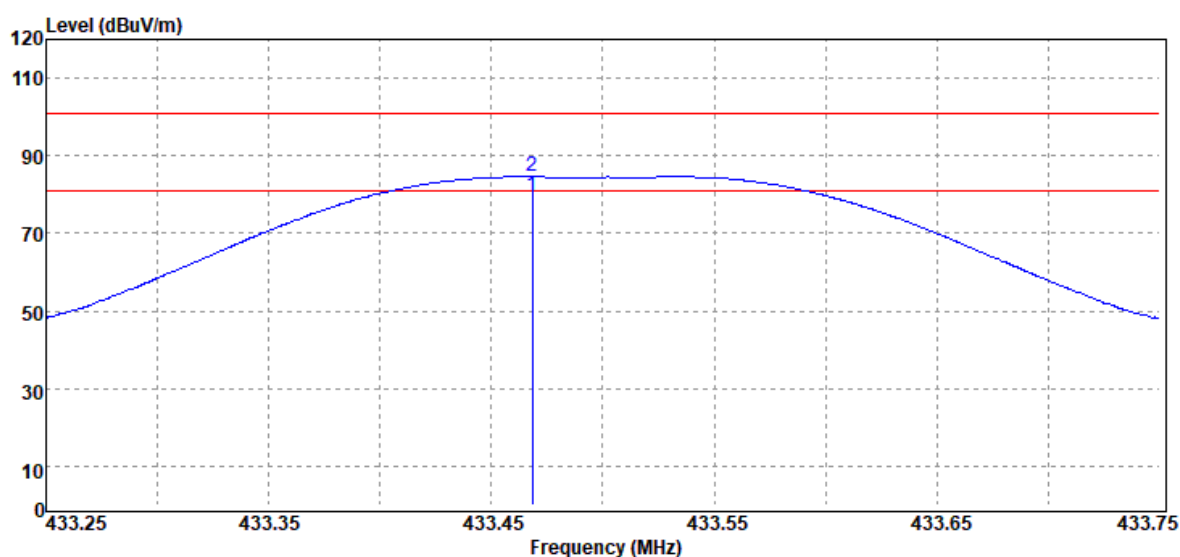
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7.9. Measurement Result

Note: Average Actual = Peak Actual + Average Factor (-4.65)

Project Number	:T190715W01	Test Date	:2019-07-29
Operation Band	:433M	Temp./Humi.	:26.5/42
Fundamental Frequency	:433.5 MHz	Engineer	:Jerry
Operation Mode	:Main CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E2 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
433.47	Average	-	-4.65	79.93	80.81	-0.88
433.47	Peak	88.84	-4.26	84.58	100.81	-16.23

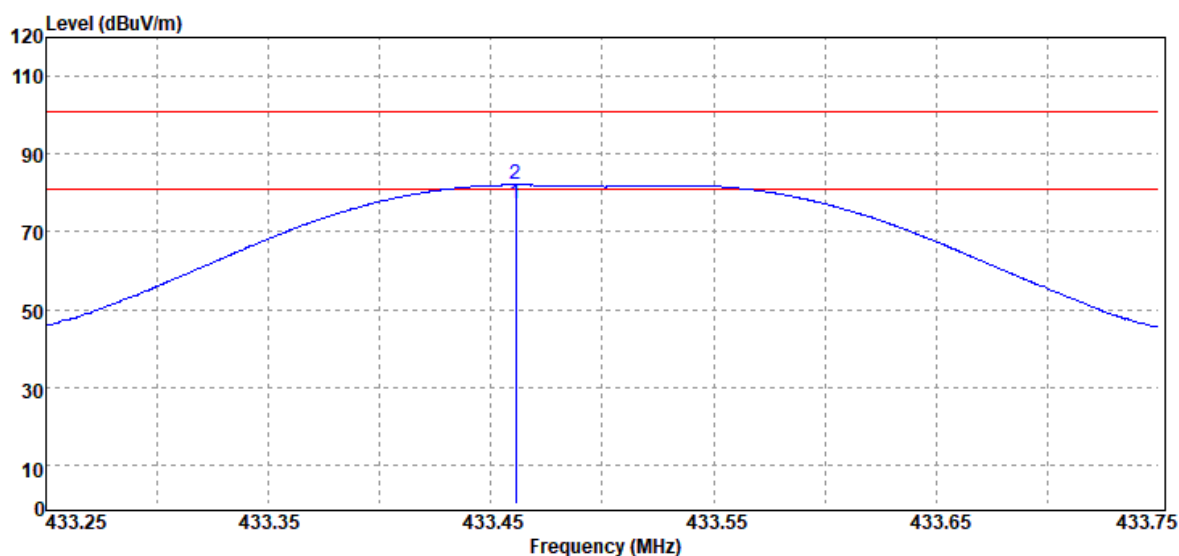
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Project Number :T190715W01
Operation Band :433M
Fundamental Frequency :433.5 MHz
Operation Mode :Main CH Mid
EUT Pol. :E2 Plan

Test Date :2019-07-29
Temp./Humi. :26.5/42
Engineer :Jerry
Measurement Antenna Pol. :VERTICAL



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
433.46	Average	-	-4.65	77.40	80.81	-3.41
433.46	Peak	86.31	-4.26	82.05	100.81	-18.76

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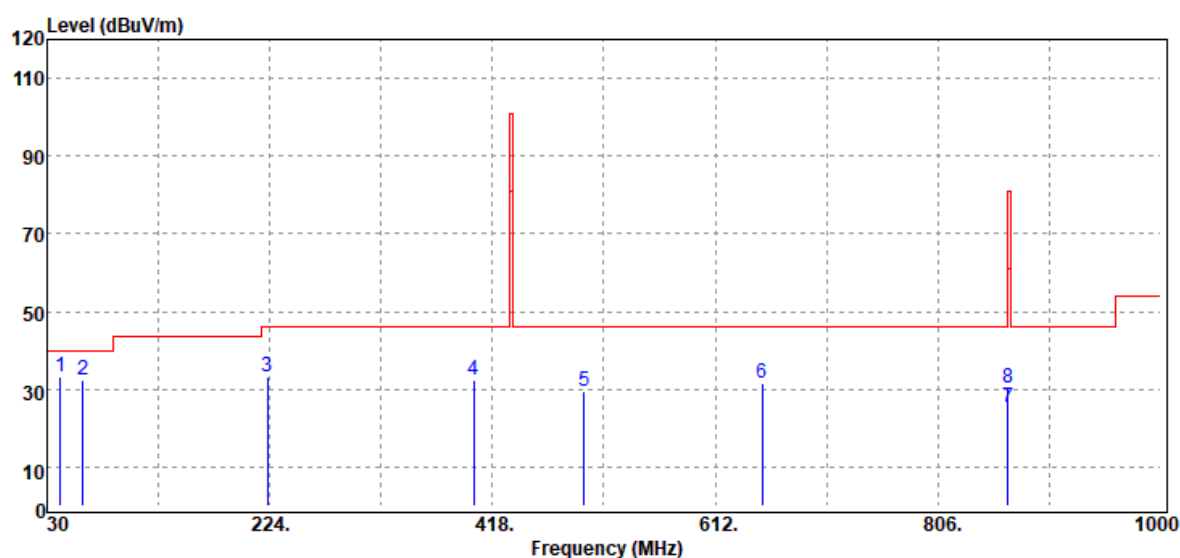
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Below 1GHz Worst-Case Data:

Note: Average Actual = Peak Actual + Average Factor (-4.65)

Report Number :T190715W01
 Operation Band :433M
 Frequency :433.5 MHz
 Operation Mode :Tx CH Mid
 EUT Pol :E2 Plan

Test Date :2019-07-22
 Temp./Humi. :25.1/42
 Antenna Pol. :VERTICAL
 Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
41.64	Peak	43.93	-10.69	33.24	40.00	-6.76
61.04	Peak	48.18	-15.64	32.54	40.00	-7.46
222.06	Peak	44.60	-11.27	33.33	46.00	-12.67
401.51	Peak	37.88	-5.63	32.25	46.00	-13.75
497.54	Peak	32.58	-3.07	29.51	46.00	-16.49
652.74	Peak	31.65	-0.30	31.35	46.00	-14.65
867.00	Average	-	-4.65	25.52	60.81	-35.29
867.00	Peak	27.31	2.86	30.17	80.81	-50.64

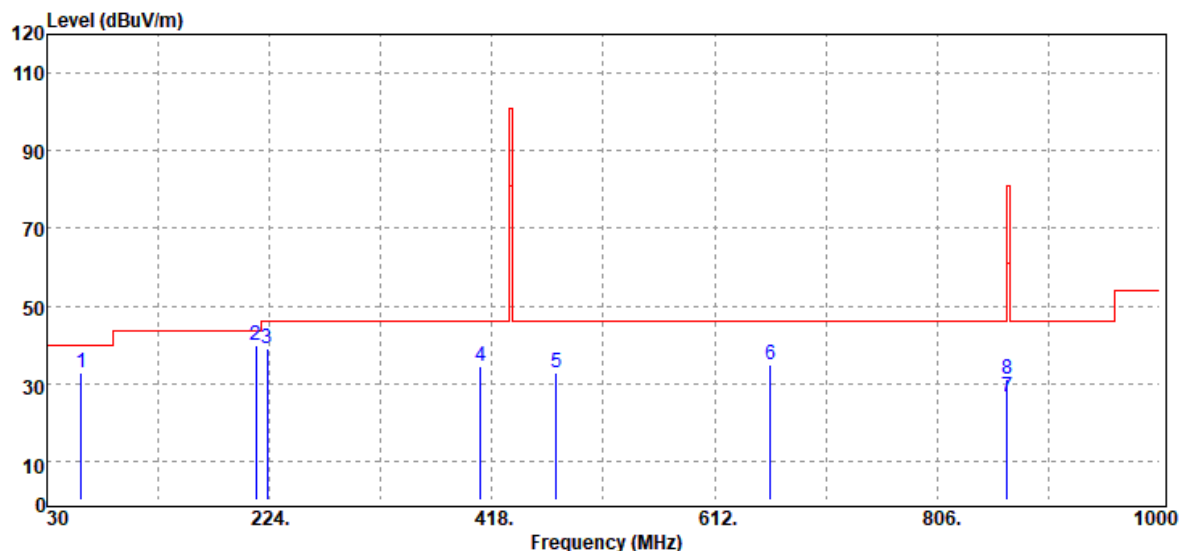
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Report Number :T190715W01
Operation Band :433M
Frequency :433.5 MHz
Operation Mode :Tx CH Mid
EUT Pol :E2 Plan

Test Date :2019-07-22
Temp./Humi. :25.1/42
Antenna Pol. :HORIZONTAL
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
60.07	Peak	48.52	-15.69	32.83	40.00	-7.17
212.36	QP	51.32	-11.54	39.78	43.50	-3.72
222.06	QP	50.22	-11.27	38.95	46.00	-7.05
408.30	Peak	39.91	-5.28	34.63	46.00	-11.37
474.26	Peak	35.84	-3.23	32.61	46.00	-13.39
660.50	Peak	34.91	-0.23	34.68	46.00	-11.32
867.00	Average	-	-4.65	26.53	500.00	-473.47
867.00	Peak	28.32	2.86	31.18	80.81	-49.63

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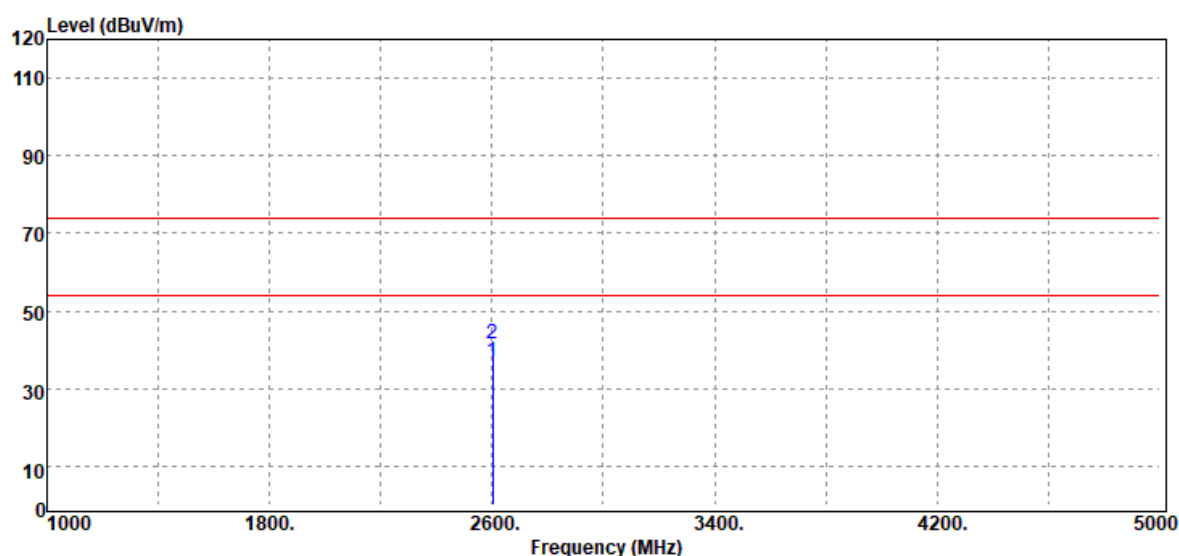
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Above 1GHz Worst-Case Data:

Note: Average Actual = Peak Actual + Average Factor (-4.65)

Report Number	:T190715W01	Test Date	:2019-07-22
Operation Band	:433M	Temp./Humi.	:25.1/42
Frequency	:433.5 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Tx CH Mid	Engineer	:Jerry
EUT Pol	:E2 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
2601.00	Average	-	-4.65	37.00	54.00	-17.00
2601.00	Peak	43.20	-1.55	41.65	74.00	-32.35

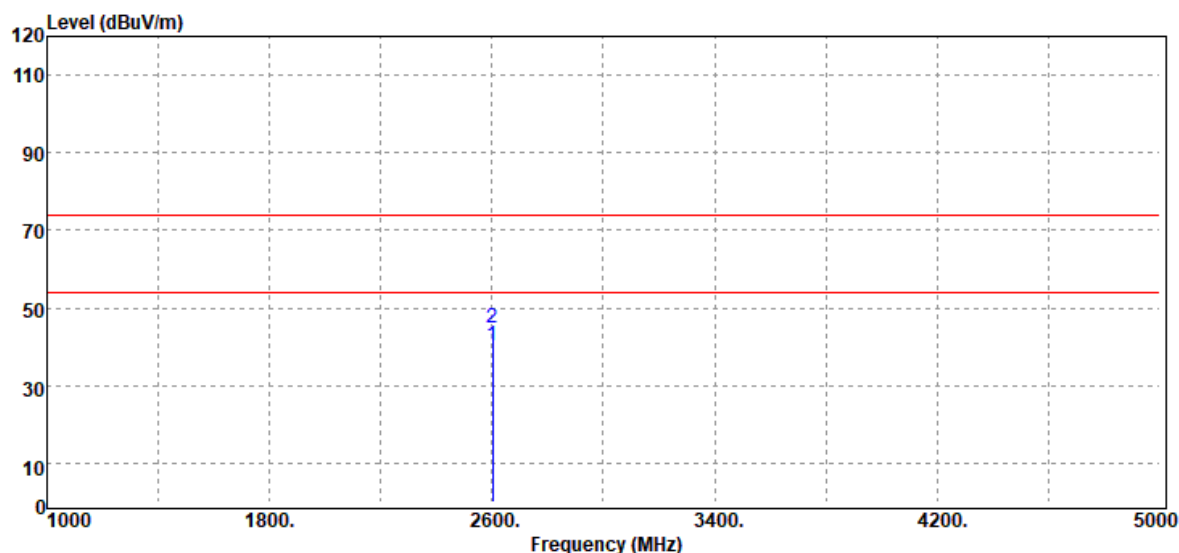
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Report Number :T190715W01
Operation Band :433M
Frequency :433.5 MHz
Operation Mode :Tx CH Mid
EUT Pol :E2 Plan

Test Date :2019-07-22
Temp./Humi. :25.1/42
Antenna Pol. :HORIZONTAL
Engineer :Jerry



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2601.00	Average	-	-4.65	40.37	54.00	-13.63
2601.00	Peak	46.57	-1.55	45.02	74.00	-28.98

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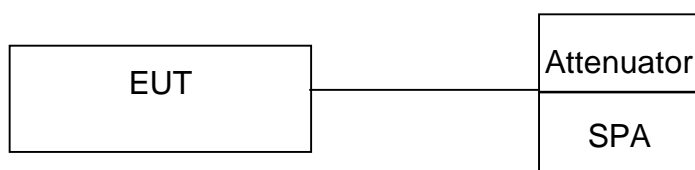
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8. 20dB & 99% OCCUPIED BANDWIDTH

8.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW= 3kHz, VBW= 10kHz, Span =300kHz.
4. Set SPA -20dB and occupied bandwidth.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY57120290	02/13/2019	02/12/2020
DC Block	Mini-Circuits	BLK-18-S+	31129(1)	02/26/2019	02/25/2020

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8.4 Measurement Results

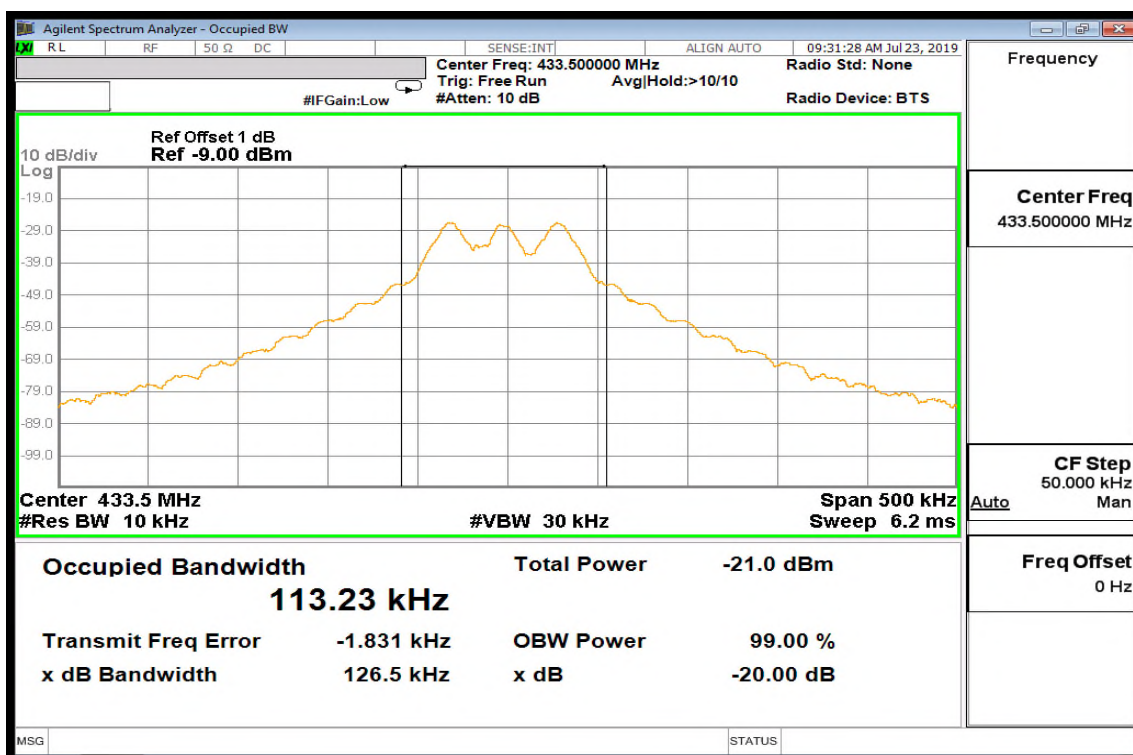
The center frequency f_c is **433.92MHz**, according to the Rules, section RSS-210 A1.3, the Bandwidth of Center Frequency at-20dB should be calculated as following:

$$433.50 \times 0.0025 = 1.0838 \text{ (MHz)}$$

CH	20dB Bandwidth (kHz)
Mid	126.5
Limit=1083.8 kHz	

CH	99% Bandwidth (kHz)
Mid	113.23
Limit=1083.8 kHz	

20dB & 99% Band Width Test Data (Mid)



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9. DUTY CYCLE MEASUREMENT

9.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 100kHz, Span =0 Hz. Adjacent sweep.
4. Set SPA View. Mark delta.

9.2 Test SET-UP (Block Diagram of Configuration)

Same as 8.3 Measurement.

9.3 Measurement Equipment Used:

Same as 8.3 Measurement.

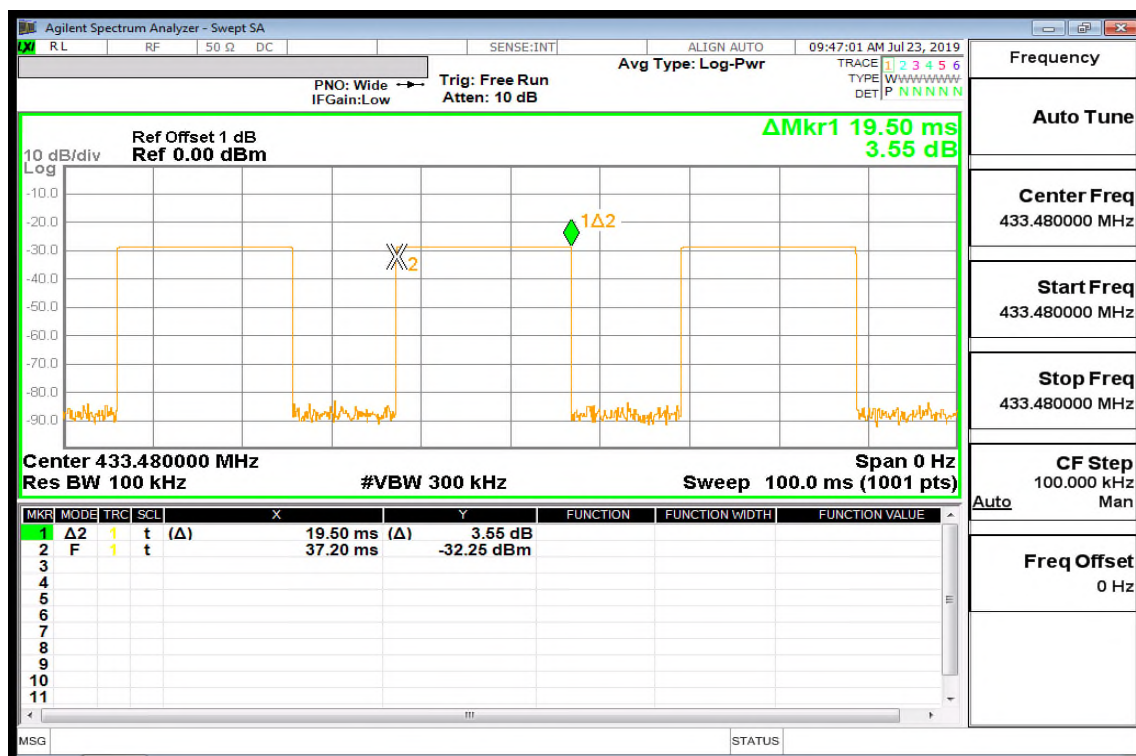
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9.4 Measurement Results:

Ton (ms)	TP=Ton+Toff (ms)	Avg correction(dB) = 20log(Ton/TP)
58.5	100	-4.656883



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10. RELEASE TIME MEASUREMENT:

15.231 (a) (1) and RSS-210 A1.1. (b)

A transmitter that has been activated automatically shall cease transmission within 5 seconds (b) of activation

10.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set SPA Center Frequency = fundamental frequency, RBW=100kHz, VBW= 100kHz, Span =0Hz. Sweep Time= 10s.
3. Set EUT as normal operation and press Transmitter bottom.
4. Set SPA Max hold. Delta Mark.

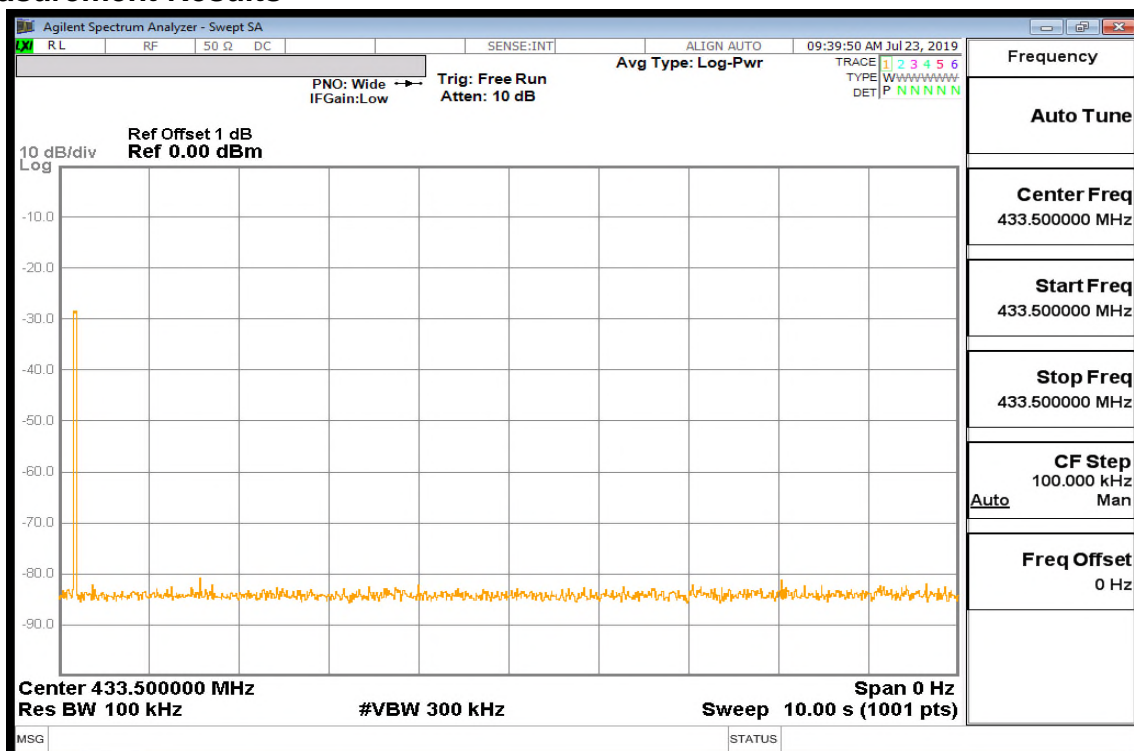
10.2 Test SET-UP (Block Diagram of Configuration)

Same as 8.3 Measurement.

10.3 Measurement Equipment Used:

Same as 8.3 Measurement.

10.4 Measurement Results



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11. ANTENNA REQUIREMENT:

11.1 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.

11.2 Antenna Connected Construction:

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

~ End of Report ~

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