

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT OF

Product Name: Wireless Control Panel
Brand Name: Vital Home Systems
Marketing Name: AWSAM
Model No.: VHS-1060
Model Difference: N/A
FCC ID: 2AD4D-1060
Report No.: ER/2016/80133
Issue Date: Sep. 13, 2016
FCC Rule Part: §15.231
Prepared for: Vital Home Systems, LLC
2266 Tigereye Place, Carlsbad, CA 92009
USA
Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No.134, Wu Kung Road, New Taipei
Industrial Park, Wuku District, New Taipei
City, Taiwan 24803



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VERIFICATION OF COMPLIANCE

Applicant: Vital Home Systems, LLC
2266 Tigereye Place, Carlsbad, CA 92009 USA

Product Name: Wireless Control Panel

Brand Name: Vital Home Systems

Marketing Name: AWSAM

Model No.: VHS-1060

Model Difference: N/A

FCC ID: 2AD4D-1060

Report Number: ER/2016/80133

Date of test: Aug. 15, 2016 ~ Sep. 07, 2016

Date of EUT Received: Aug. 15, 2016

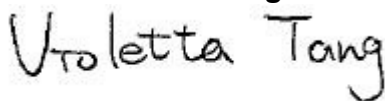
We hereby certify that:

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:**Date:**

Sep. 13, 2016

Louis Chen / Engineer**Prepared By:****Date:**

Sep. 13, 2016

Violetta Tang / Clerk**Approved By:****Date:**

Sep. 13, 2016

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
ER/2016/80133	Rev.00	Initial creation of document	Sep. 13, 2016

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1. GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	Wireless Control Panel	
Brand Name:	Vital Home Systems	
Marketing Name:	AWSAM	
Model No.:	VHS-1060	
Model Difference:	N/A	
Hardware Version:	N/A	
Software Version:	N/A	
USB Cable:	Model No.: N/A, Supplier: N/A	
Power Supply:	3.7Vdc from Rechargeable Li-ion Battery or 5V from AC/DC Power Adapter	
	Battery:	Model No.: JFC503040, Supplier: N/A
	Adapter:	Model No.: YLS0121B-T050200, Supplier: Dongguan Yinli Electronics Co., Ltd.

433.92MHz:

Operating Frequency	433.92MHz
Transmit Power	≤ 86.45dBuV/m Max.
Modulation Technique	ASK
Number of Channels	1 Channel
Antenna Type	Helical Antenna

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1.2 Test Methodology

FCC Part 15, Subpart C §15.231

ANSI C63.10:2013

Note:

1. All test items have been performed and record as per the above standards.
2. The composite system is compliance with FCC Subpart B is authorized under the certification procedure.

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. (TAF code 0513)

FCC Registration Numbers are: 509634

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 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 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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2.5 Limitation

(1) Conducted Emission

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

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 - 56	56 - 46
0.5 – 5	56	46
5 - 30	60	50

(2) Radiated Emission

According to 15.231(b), 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

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- Remark 1. Emission level in dBuV/m = $20 \log (\mu\text{V/m})$
:
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, $\mu\text{V/m}$ at 3meters = $56.81818(F) - 6136.3636$;
For the band 260-470MHz $\mu\text{V/m}$ at 3meters = $41.6667(F) - 7083.3333$;
Where F is the frequency in MHz.

Operation	433.92 MHz
Freq.	
$41.6667 \times 433.92 - 7083.3333 =$	10996.681 $\mu\text{V/m}$
$20\log(10996.68) = 80.83$	dBuV/m (AV Limit)
$80.83 + 20 = 100.83$	dBuV/m (Peak Limit)

2.6 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

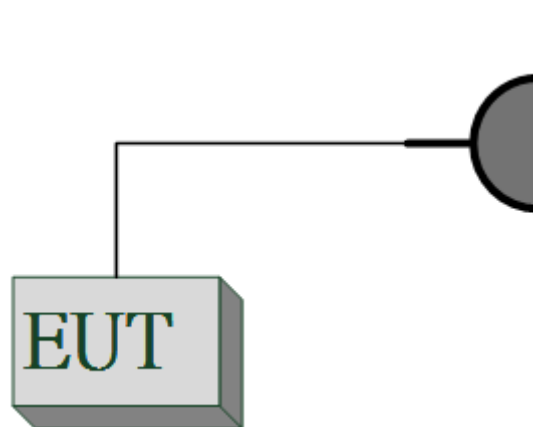


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	N/A					

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	Compliant
§15.231	Radiated Emission	Compliant
§15.231(c)	20dB Bandwidth	Compliant
§15.35 (c)	Duty Cycle Test (Pulse Modulation)	Compliant
§15.231(a)(1)	Release Time Measurement	Compliant

4. DESCRIPTION OF TEST MODES

4.1 Operated in 433.92MHz Band

1 channel is provided.

CH	FREQUENCY
01	433.92MHZ

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4.2 The Worst Test Modes and Channel Details

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
433.92 MHz	1	1	GFSK	1	MAIN
RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
433.92 MHz	1	1	GFSK	1	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 433.92MHz Transmitter for channel Low, Mid and High, the worst case H position was reported.

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
433.92 MHz	1	1	GFSK	1	MAIN

Note:

Per 15.31 (e) - For battery operated equipment, the equipment tests shall be performed using a new battery. All test items for this report are performed with a new battery.

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5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55 dB
20dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Frequency Separation	+/- 123.36 Hz
Number of hopping frequency	+/- 123.36 Hz
Time of Occupancy	+/- 123.36 Hz
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: +2.3dB
	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: +2.3dB
	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. CONDUCTED EMISSIONS TEST (NOT APPLY IN THE REPORT)

6.1 Standard Applicable

According to §15.207 and 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:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017
LISN	SCHWARZBECK	NSLK 8127	8127-649	05/16/2016	05/15/2017
LISN	MESS TEC	FCC-LISN-50/2 50-25-2-01	4034	05/16/2016	05/15/2017
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2015	11/25/2016

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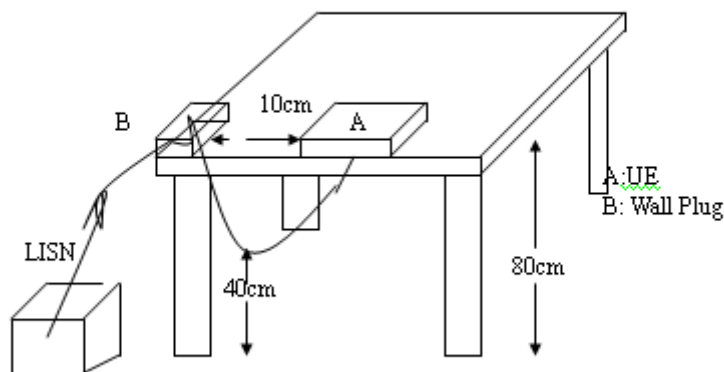
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6.3 EUT Setup

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.

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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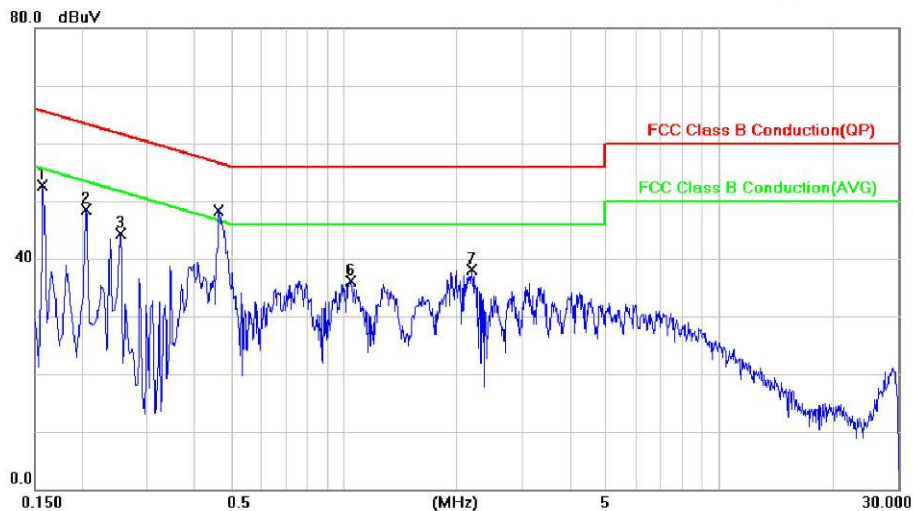
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test By:	Louis
Temperature:	20 °C	Humidity:	58 %		

Site Conduction Room	Phase: L1	Temperature: 20 °C
Limit: FCC Class B Conduction(QP)	Power: AC 120V/60Hz	Humidity: 58 %
Mode: Operation		
Note: Adapter:YLS0121B-T3502000		

Conducted Emission

File :80133 Data :#3 Date: 2016/8/31 Time: 下午 10:53:40



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1580	52.59	0.07	52.66	65.57	-12.91	peak	
2		0.2060	48.36	0.08	48.44	63.37	-14.93	peak	
3		0.2540	44.19	0.09	44.28	61.63	-17.35	peak	
4		0.4660	46.70	0.10	46.80	56.58	-9.78	QP	
5 *		0.4660	40.90	0.10	41.00	46.58	-5.58	AVG	
6		1.0460	35.96	0.12	36.08	56.00	-19.92	peak	
7		2.1980	37.86	0.16	38.02	56.00	-17.98	peak	

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Site: Conduction Room
Limit: FCC Class B Conduction(QP)
Mode: Operation
Note: Adapter:YLS0121B-T3502000

Phase: **N**
Power: AC 120V/60Hz

Temperature: 20 °C
Humidity: 58 %

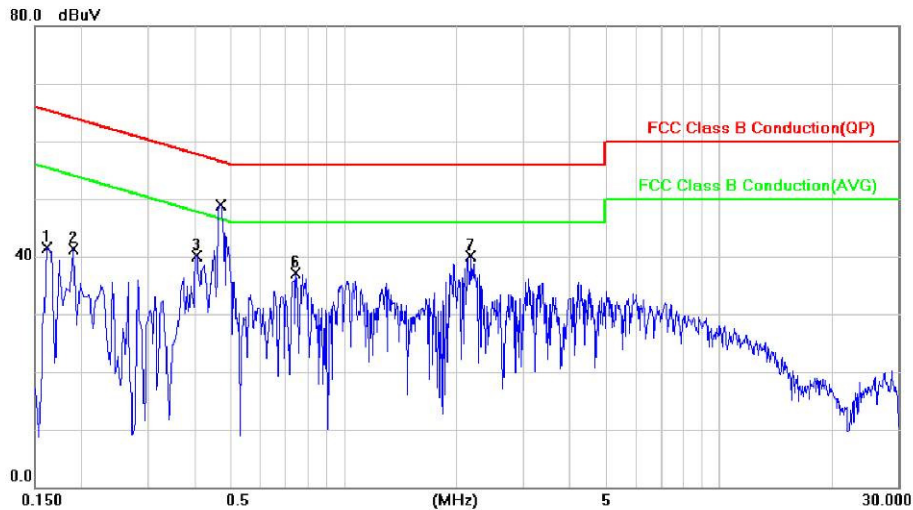
Conducted Emission

File :80133

Data :#2

Date: 2016/8/31

Time: 下午 10:52:26



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	41.36	0.07	41.43	65.36	-23.93	peak	
2		0.1900	41.24	0.08	41.32	64.04	-22.72	peak	
3		0.4060	39.97	0.10	40.07	57.73	-17.66	peak	
4		0.4700	48.70	0.10	48.80	56.51	-7.71	QP	
5 *		0.4700	39.80	0.10	39.90	46.51	-6.61	AVG	
6		0.7460	37.05	0.11	37.16	56.00	-18.84	peak	
7		2.1820	39.86	0.16	40.02	56.00	-15.98	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. 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.

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 over 30MHz are shown on the test report.

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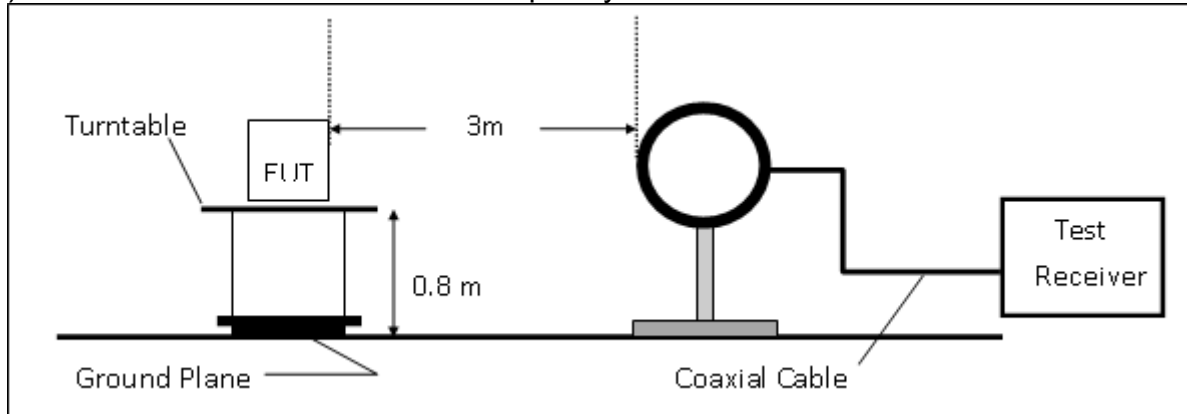
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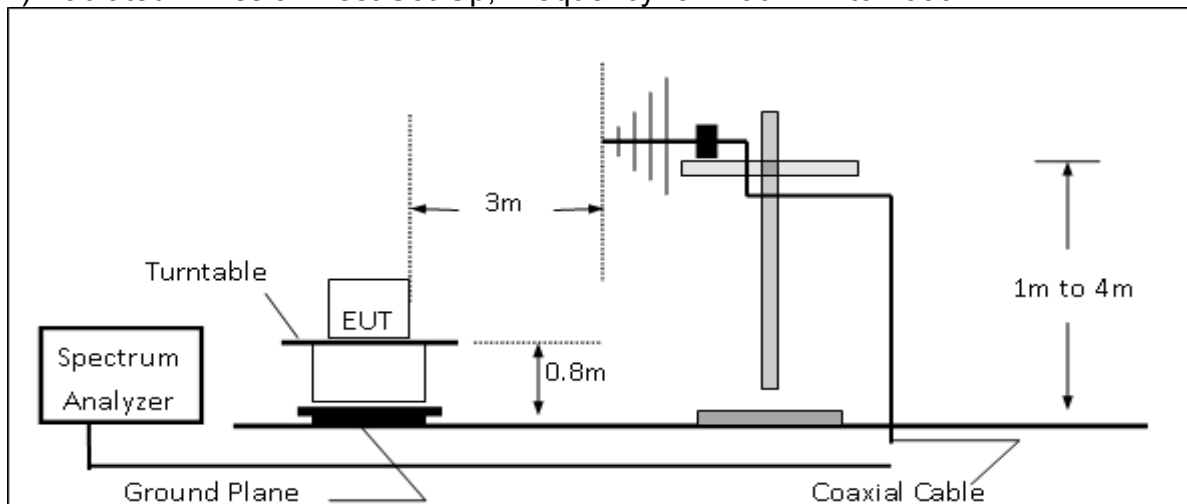
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7.2 Test SET-UP (Block Diagram of Configuration).

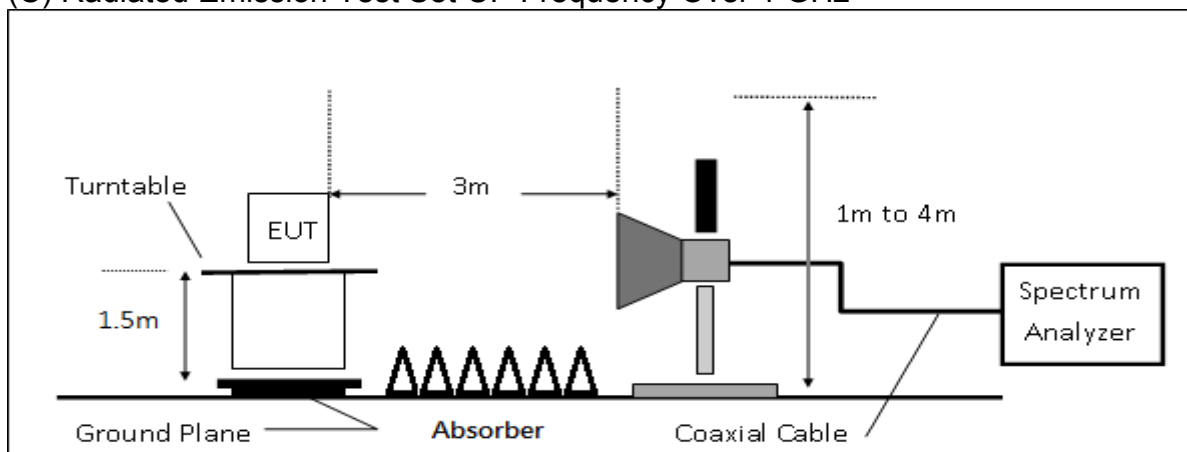
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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7.3 Measurement Equipment Used:

SGS SAC-III					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2016	01/28/2017
Loop Antenna	ETS.LINDGREN	6502	148045	09/07/2015	09/06/2016
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/14/2015	12/13/2016
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2016	01/01/2017
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/02/2016	01/01/2017
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	01/02/2016	01/01/2017
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017
Low Loss Cable	Huber Suhner	966 TX	1	01/02/2016	01/01/2017
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2015	12/11/2016
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2016	01/01/2017

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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	

Remark:

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

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.

“---” : denotes Noise Floor.

7.5. 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.

7.6. Measurement Result:

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

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7.7. Measurement Result: Main

Operation Band	:433 MHz	Test Date	:2016-08-31
Fundamental Frequency	:433.95 MHz	Temp./Humi.	:24.5 deg_C / 57RH
Operation Mode	:MAIN	Engineer	:Kane
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
433.90	F	Peak	89.98	-3.53	86.45	100.87	-14.42
433.95	F	Aveage	---	-17.33	69.12	80.87	-11.75

Operation Band	:433 MHz	Test Date	:2016-08-31
Fundamental Frequency	:433.95 MHz	Temp./Humi.	:24.5 deg_C / 57RH
Operation Mode	:MAIN	Engineer	:Kane
EUT Pol.	:H Plane	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	dBμV	dB	dBμV/m	dBμV/m	dB
433.95	F	Peak	83.36	-3.53	79.83	100.87	-21.04
433.95	F	Aveage	---	-17.33	62.5	80.87	-18.37

Note: Average Actual = Peak Actual + Average Factor (-17.33)

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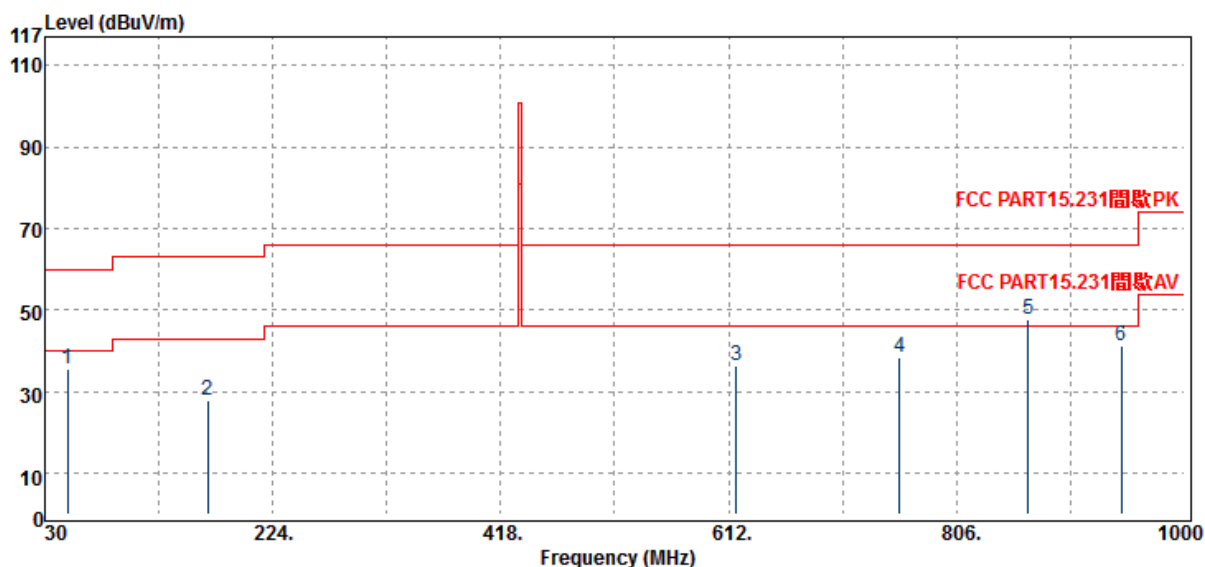
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Radiated Spurious Emission

Operation Band	:433 MHz	Test Date	:2016-08-31
Fundamental Frequency	:433.95 MHz	Temp./Humi.	:24.5 deg_C / 57RH
Operation Mode	:TX	Engineer	:Kane
EUT Pol.	:H Plane	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
49.40	S	Peak	43.49	-7.74	35.75	60.00	-24.25
168.71	S	Peak	35.46	-7.52	27.94	63.00	-35.06
618.79	S	Peak	36.32	0.00	36.32	66.00	-29.68
757.50	S	Peak	35.55	3.01	38.56	66.00	-27.44
867.9	H	Peak	43.01	4.76	47.77	66.00	-18.23
867.9	H	Average	---	-17.33	30.44	46.00	-15.56
946.65	S	Peak	35.88	5.42	41.30	66.00	-24.70

Note: Average Actual = Peak Actual + Average Factor (-17.33)

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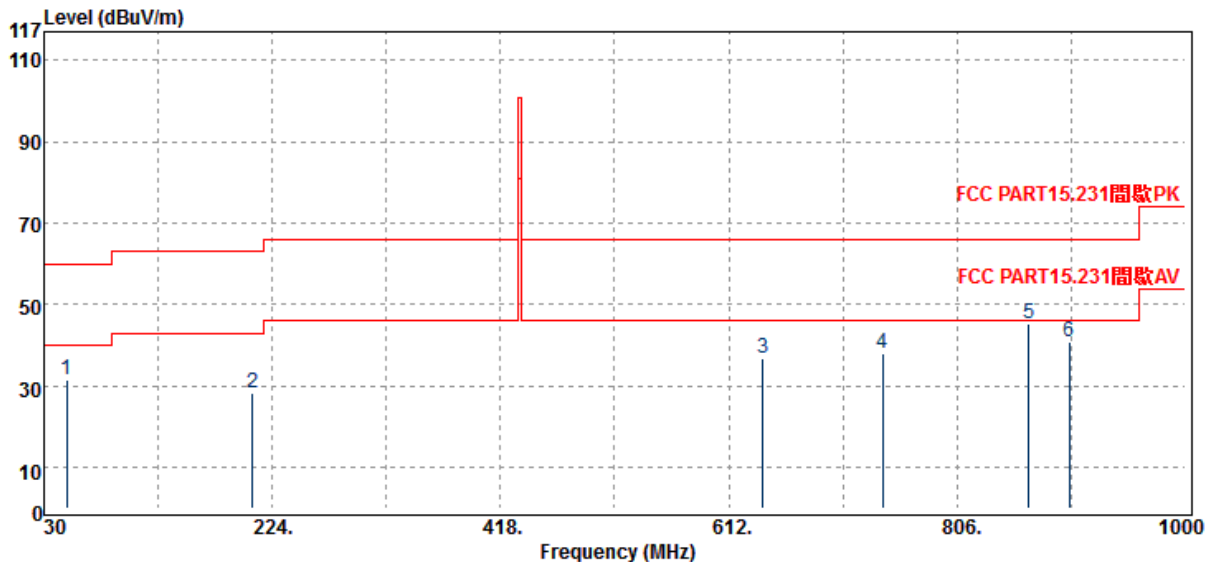
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Operation Band	:433 MHz	Test Date	:2016-08-31
Fundamental Frequency	:433.95 MHz	Temp./Humi.	:24.5 deg_C / 57RH
Operation Mode	:TX	Engineer	:Kane
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	dB μ V	dB	dB μ V/m	dB μ V/m	dB
49.40	S	Peak	39.24	-7.74	31.50	60.00	-28.50
207.51	S	Peak	38.10	-9.73	28.37	63.00	-34.63
641.10	S	Peak	36.33	0.48	36.81	66.00	-29.19
742.95	S	Peak	35.93	2.27	38.20	66.00	-27.80
867.9	H	Peak	40.64	4.76	45.40	66.00	-20.60
901.06	S	Peak	36.40	4.68	41.08	66.00	-24.92

Note: Average Actual = Peak Actual + Average Factor (-17.33)

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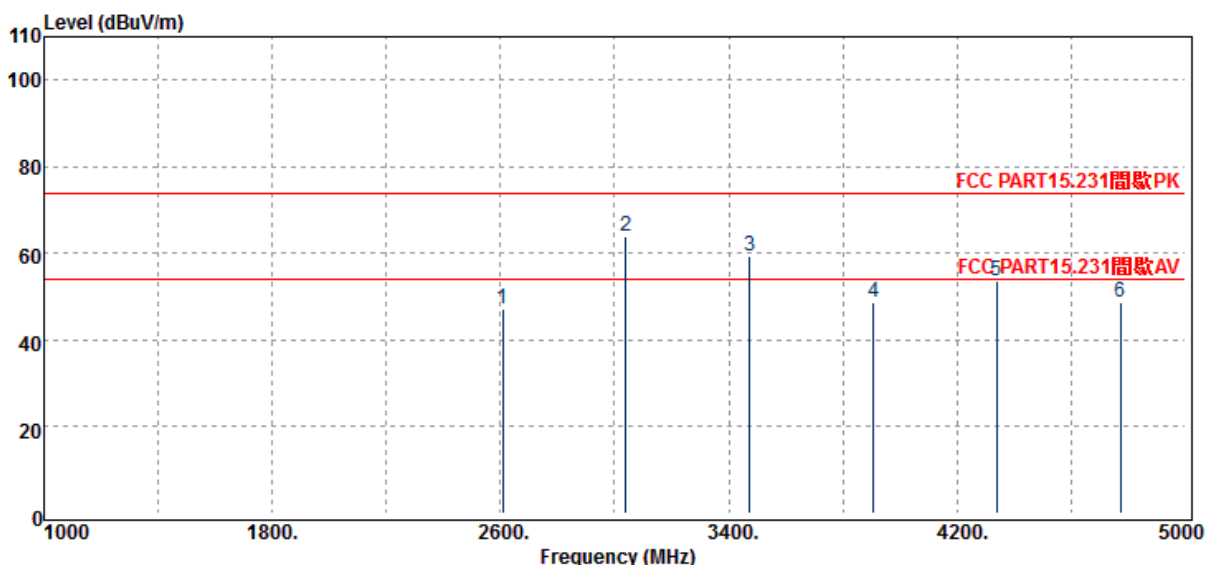
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Operation Band	:433 MHz	Test Date	:2016-08-31
Fundamental Frequency	:433.95 MHz	Temp./Humi.	:24.5 deg_C / 57RH
Operation Mode	:TX	Engineer	:Kane
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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
2603.70	H	Peak	48.54	-1.31	47.23	74.00	-26.77
3037.65	H	Peak	63.93	0.08	64.01	74.00	-9.99
3037.65	H	Aveage	---	-17.33	46.68	54.00	-7.32
3471.60	H	Peak	58.71	0.86	59.57	74.00	-14.43
3471.60	H	Aveage	---	-17.33	42.24	54.00	-11.76
3905.55	H	Peak	46.20	2.38	48.58	74.00	-25.42
4339.50	H	Peak	50.14	3.38	53.52	74.00	-20.48
4773.45	H	Peak	43.85	4.85	48.70	74.00	-25.30

Note: Average Actual = Peak Actual + Average Factor (-17.33)

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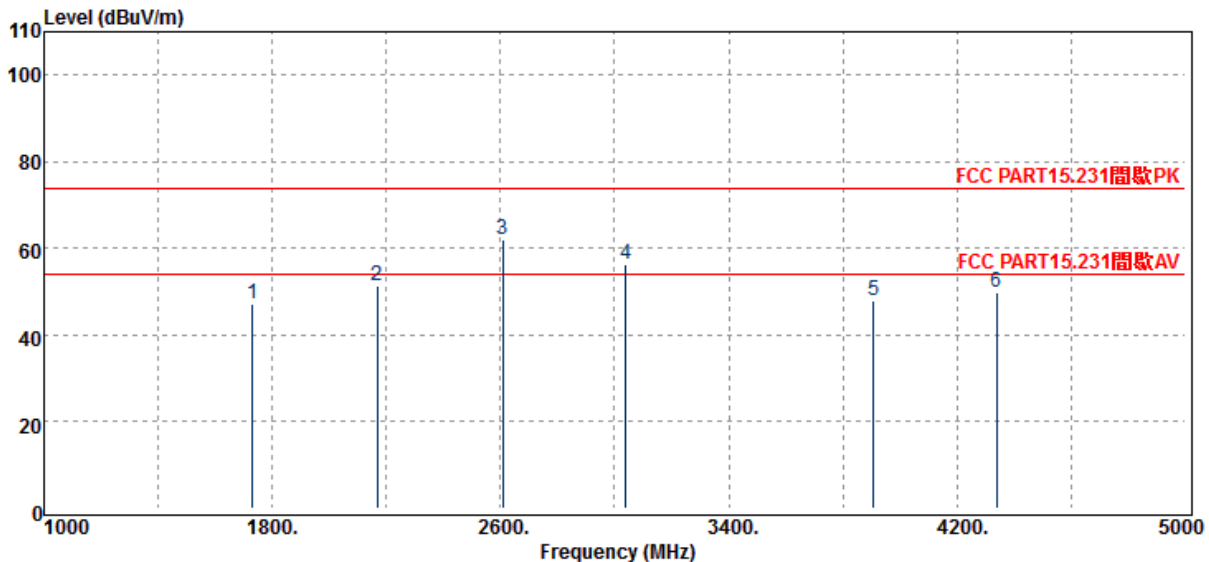
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Operation Band	:433 MHz	Test Date	:2016-08-31
Fundamental Frequency	:433.95 MHz	Temp./Humi.	:24.5 deg_C / 57RH
Operation Mode	:TX	Engineer	:Kane
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
1735.80	H	Peak	52.44	-5.06	47.38	74.00	-26.62
2169.75	H	Peak	53.34	-1.88	51.46	74.00	-22.54
2603.70	H	Peak	63.44	-1.31	62.13	74.00	-11.87
2603.70	H	Average	---	-17.33	44.80	54.00	-9.20
3037.65	H	Peak	56.18	0.08	56.26	74.00	-17.74
3037.65	H	Average	---	-17.33	38.93	54.00	-15.07
3905.55	H	Peak	45.57	2.38	47.95	74.00	-26.05
4339.50	H	Peak	46.36	3.38	49.74	74.00	-24.26

Note: Average Actual = Peak Actual + Average Factor (-17.33)

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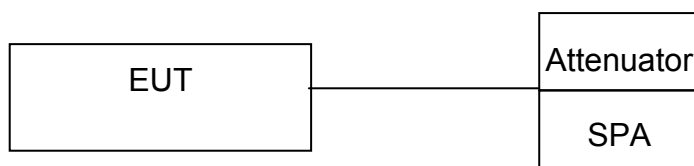
8. 20 dB OCCUPIED BANDWIDTH

§15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

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, VBW= 10KHz, Span =100KHz.
4. Set SPA -20dB Occupied bandwidth.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

SGS Conducted Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017
DC Power Supply	Agilent	E3640A	MY52410006	11/05/2015	11/04/2016
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017

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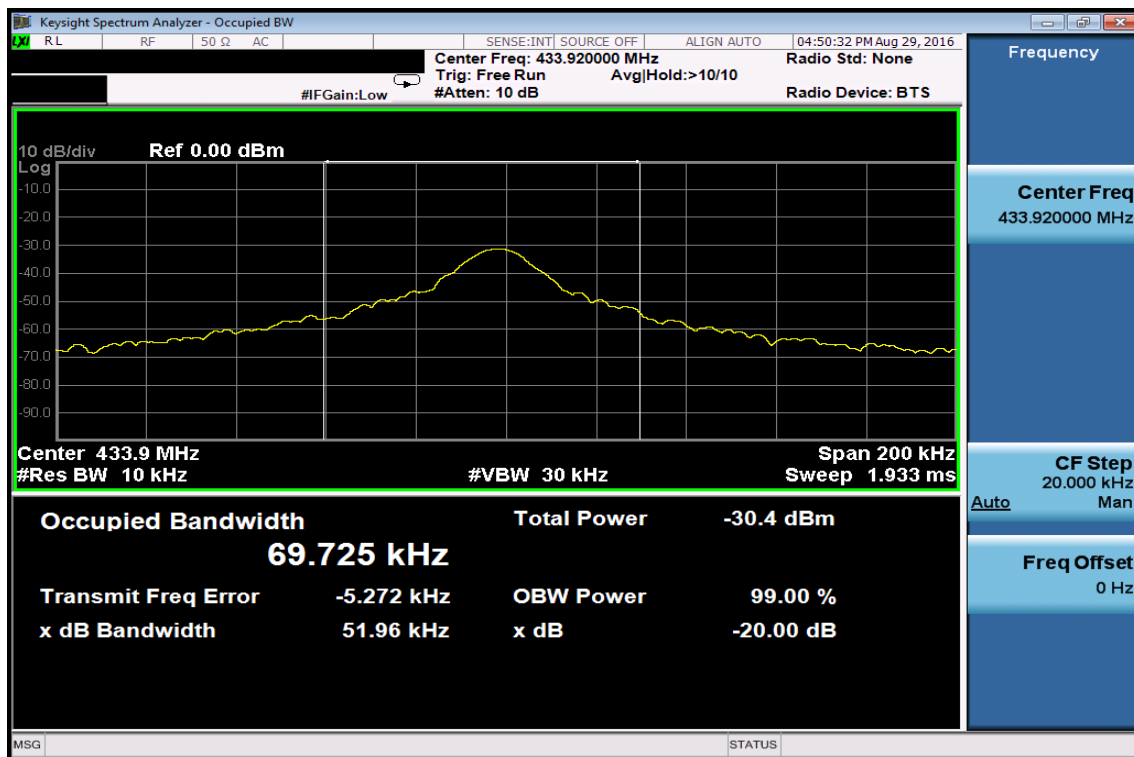
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8.4 Measurement Results

Freq.(MHz)	20dB Bandwidth (kHz)	Limit (kHz) = f * 25%
433.92	51.96	1084.8

20dB Band Width Test Data



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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 Radiated Emission Measurement.

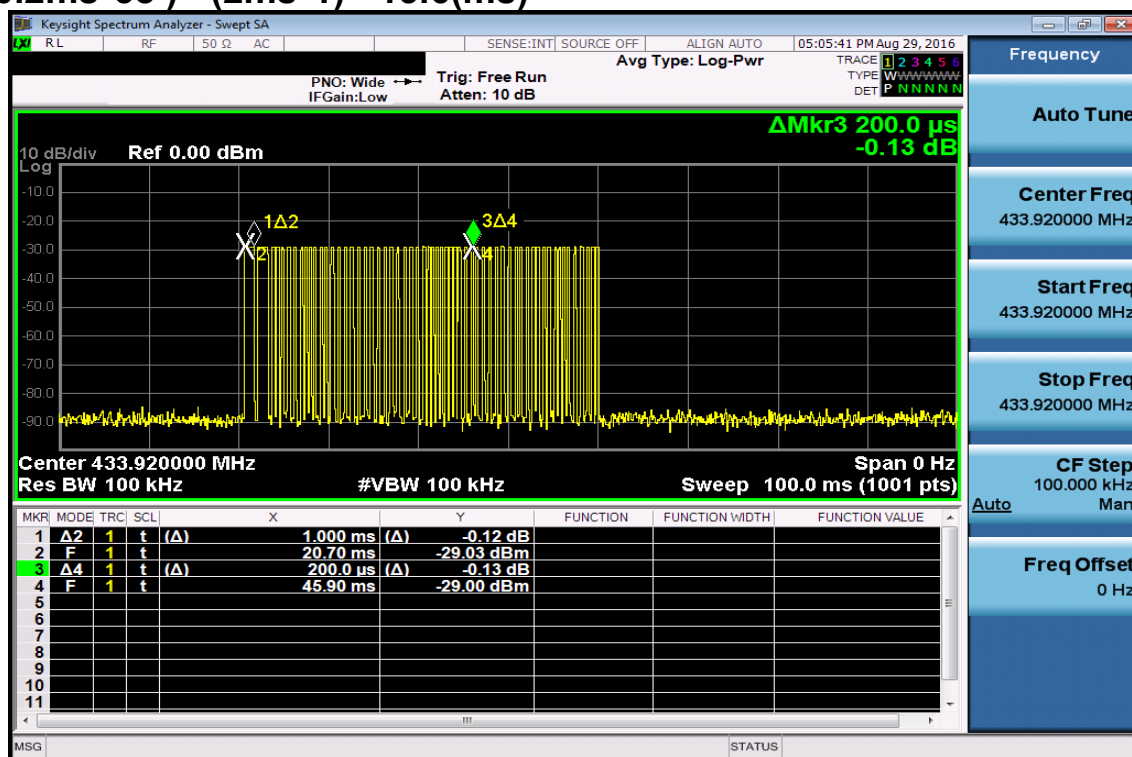
9.3 Measurement Equipment Used:

Same as 8.3 Radiated Emission Measurement.

9.4 Measurement Results:

Ton (ms)	TP=Ton+Toff (ms)	Avg correction(dB) = 20log(Ton/TP)
13.6	100	-17.33

$$\text{Ton} = (0.2\text{ms} \times 58) + (2\text{ms} \times 1) = 13.6(\text{ms})$$



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10. RELEASE TIME MEASUREMENT:

15.231 (a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

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= 5s.
3. Set EUT as normal operation and press Transmitter bottom for 2 s approximately,
4. Set SPA Max hold. Delta Mark.

10.2 Test SET-UP (Block Diagram of Configuration)

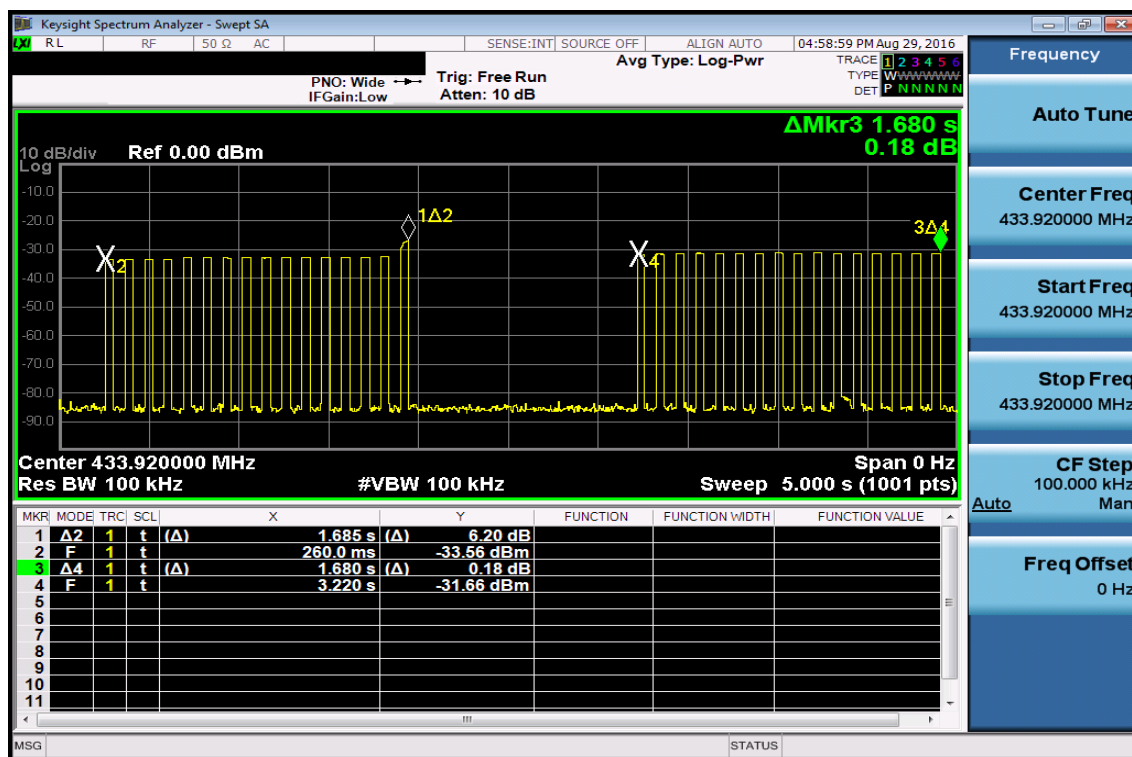
Same as 8.3 Radiated Emission Measurement.

10.3 Measurement Equipment Used:

Same as 8.3 Radiated Emission Measurement.

10.4 Measurement Results

The release time is less than 5 s.



Note: X = release time

~ End of Report ~

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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