

RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant/ Manufacturer : SEIKAKU TECHNICAL GROUP LIMITED

Address : Offshore Chambers, P.O. Box 217, Apia, Samoa

Factory : Dongguan Jingheng Electron Co., Ltd.

Address : Shenshan Industrial City, Hengli Town, Dongguan, Guangdong 523465, P.R. China

E.U.T. : UHF PLL Wireless System

Brand Name : TOPP PRO, SHOW

Model No. : KTX

FCC ID : H38KTX

Measurement Standard : FCC PART 15.236, KDB206256 D01

Date of Receiver : June 20, 2018

Date of Test : June 21, 2018 to May 15, 2019

Date of Report : May 24, 2019

This Test Report is Issued Under the Authority of :

Prepared by



Alina Guo / Engineer

Approved & Authorized Signer



Iori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

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Revision History of This Test Report

Report Number	Description	Issued Date
NTC1806145FV00	Initial Issue	2019-05-24

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test

Product Name	: UHF PLL Wireless System
Main Model Name	: KTX
Additional Model Name	: N/A
Model difference	: N/A
Brand Name	: TOPP PRO, SHOW
Power Supply	: DC 1.5V From AA battery DC 5V From adapter
Adapter	: M/N: KSAS0050500D5U Input: AC 100-240V 50/60Hz, 0.18A Output: DC 5V, 1.0A
Test voltage	: AC 120V/60Hz, DC 1.5V from AA battery Only the worst case was record in the report.
Hardware version	: V1.0
Software version	: V1.0
Serial number	: N/A
Note	: N/A

Technical parameters

Frequency Range	: 470-494MHz, 494-518MHz 518-542MHz, 542-566MHz
Modulation	: FM
Antenna Type	: Integral antenna
Antenna Gain	: 0dBi
Peak Deviation	: 48KHz (Declaration by manufacturer)
Number of Channel	: 64 totally (4*16 channel)

Channel List

470-494MHz		494-518MHz		518-542MHz		542-566MHz	
Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
0	470.125	0	494.125	0	518.125	0	542.125
1	471.625	1	495.625	1	519.625	1	543.625
2	473.050	2	497.050	2	521.050	2	545.050
3	474.425	3	498.425	3	522.425	3	546.425
4	474.900	4	498.900	4	522.900	4	546.900
5	477.525	5	501.525	5	525.525	5	549.525
6	479.100	6	503.100	6	527.100	6	551.100
7	480.475	7	504.475	7	528.475	7	552.475
8	482.000	8	506.000	8	530.000	8	554.000
9	484.075	9	508.075	9	532.075	9	556.075
A	486.975	A	510.975	A	534.975	A	558.975
B	487.975	B	511.975	B	535.975	B	559.975
C	489.050	C	513.050	C	537.050	C	561.050
D	490.975	D	514.975	D	538.975	D	562.975
E	492.425	E	516.425	E	540.425	E	564.425
F	493.975	F	517.975	F	541.975	F	565.975

Note: According to section 15.31(m), regards to the operating frequency range over 10MHz, the Lowest, Middle, and the Highest frequency of channel were selected to perform the test. The selected frequency see below:

Channel	Frequency MHz
0	470.125
0	518.125
F	565.975

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **H38KTX** filing to comply with Section 15.236 of the FCC Part 15(2016), Subpart C Rule.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013) & ETSI EN 300422-1 V1.4.2(2011-08). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

1.4 Equipment Modifications

Not available for this EUT intended for grant.

1.5 Support Device

N/A

1.6 Test Facility and Location

Site Description

EMC Lab : Listed by CNAS, August 13, 2018
The certificate is valid until August 13, 2024
The Laboratory has been assessed and proved to
be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2019
The Laboratory has been assessed and proved to
be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number. Is 46405-9743

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

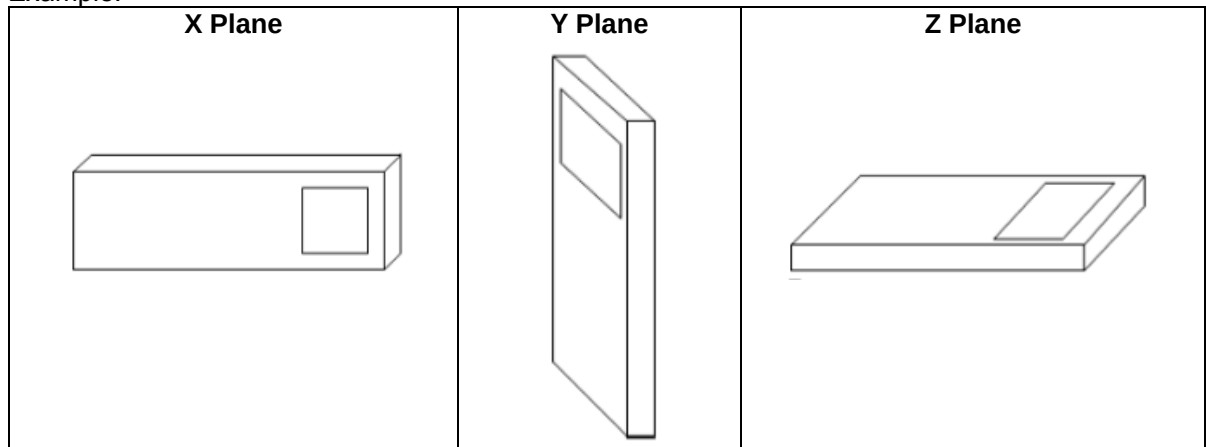
Site Location : Building D, Gaosheng Science & Technology Park,
Zhouxi Longxi Road, Nancheng District, Dongguan
City, Guangdong Province, China

1.7 Summary of Test Results

FCC Rules	Description Of Test	Uncertainty	Result
§15.207 (a)	AC Power Conducted Emission	±1.06dB	Compliant
§15.236(d)	RF Output Power	±1.06dB	Compliant
§15.236(f)	Occupied Bandwidth	±1.42 x10 ⁻⁴ %	Compliant
§15.236(f)(3)	Frequency stability	±1.06dB	Compliance
§15.236(g)	Transmitter Spurious Emissions & Emission mask	±3.70dB & ±1.70dB	Compliance
§15.203	Antenna Requirement	N/A	Compliant

Note: 1. The EUT operating multiple positions, so the EUT shall be performed three orthogonal planes. The worst plane is Z.
 2. The EUT has been tested as an independent unit. And Continual transmitting in maximum power (The new battery be used during test)

Example:



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 Special Accessories

Not available for this EUT intended for grant.

2.3 Description of test modes

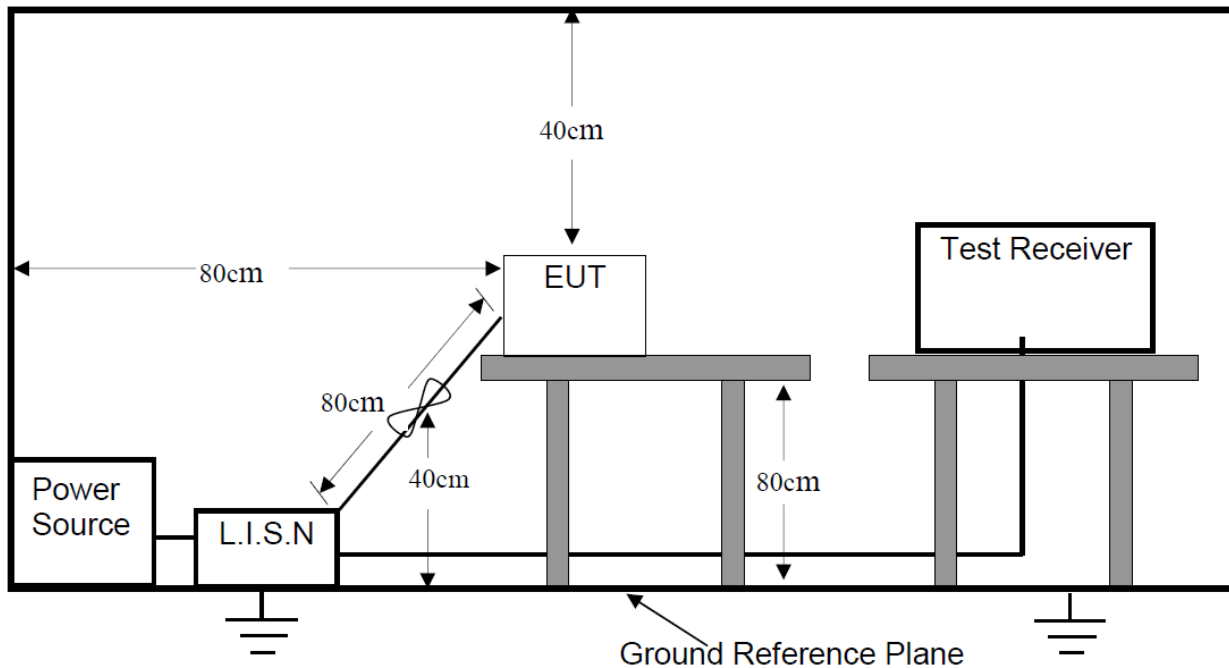
The EUT has been tested under continuous operating condition (The duty cycle >98%). Test program used to control the EUT staying in continuous transmitting mode.

2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

3. Conducted Emissions Test

3.1 Test SET-UP (Block Diagram of Configuration)



3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: TX Mode

3.3 Measurement Results

Please refer to following plots.



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

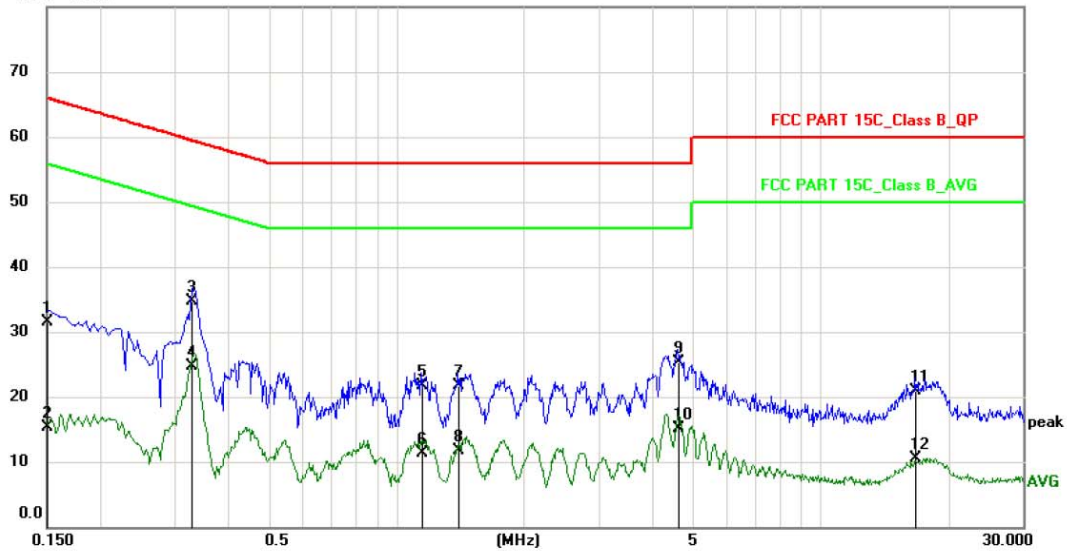
Conducted Emission Measurement

File : KTX
80.0 dBuV

Data : #1

Date: 2018-6-25

Time: 13:35:29



Site

Phase: **L1**

Temperature: 26

Limit: FCC PART 15C_Class B_QP

Power: AC120V/60Hz

Humidity: 50 %

EUT: UHF PLL Wireless System

M/N: KTX

Mode: TX

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	20.90	10.60	31.50	66.00	-34.50	QP	
2		0.1500	4.80	10.60	15.40	56.00	-40.60	AVG	
3	*	0.3303	24.10	10.60	34.70	59.44	-24.74	QP	
4		0.3303	14.10	10.60	24.70	49.44	-24.74	AVG	
5		1.1420	11.10	10.70	21.80	56.00	-34.20	QP	
6		1.1420	0.70	10.70	11.40	46.00	-34.60	AVG	
7		1.4020	11.00	10.70	21.70	56.00	-34.30	QP	
8		1.4020	1.10	10.70	11.80	46.00	-34.20	AVG	
9		4.6140	14.59	10.71	25.30	56.00	-30.70	QP	
10		4.6140	4.39	10.71	15.10	46.00	-30.90	AVG	
11		16.7139	10.15	10.75	20.90	60.00	-39.10	QP	
12		16.7139	-0.25	10.75	10.50	50.00	-39.50	AVG	

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

<Reference Only



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

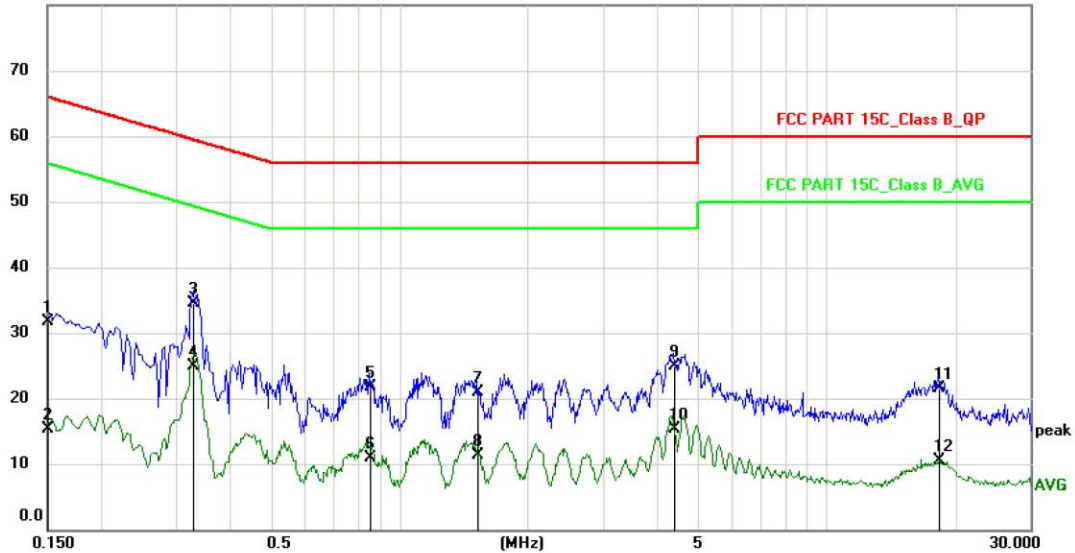
Conducted Emission Measurement

File :KTX
80.0 dBuV

Data :#2

Date: 2018-6-25

Time: 13:42:15



Site

Phase: **N**

Temperature: 26

Limit: FCC PART 15C_Class B_QP

Power: AC120V/60Hz

Humidity: 50 %

EUT: UHF PLL Wireless System

M/N: KTX

Mode: TX

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	21.20	10.60	31.80	66.00	-34.20	QP	
2		0.1500	4.80	10.60	15.40	56.00	-40.60	AVG	
3		0.3300	23.90	10.60	34.50	59.45	-24.95	QP	
4	*	0.3300	14.30	10.60	24.90	49.45	-24.55	AVG	
5		0.8500	11.12	10.68	21.80	56.00	-34.20	QP	
6		0.8500	0.32	10.68	11.00	46.00	-35.00	AVG	
7		1.5220	10.30	10.70	21.00	56.00	-35.00	QP	
8		1.5220	0.60	10.70	11.30	46.00	-34.70	AVG	
9		4.3859	14.29	10.71	25.00	56.00	-31.00	QP	
10		4.3859	4.59	10.71	15.30	46.00	-30.70	AVG	
11		18.3020	10.74	10.76	21.50	60.00	-38.50	QP	
12		18.3020	-0.26	10.76	10.50	50.00	-39.50	AVG	

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

(Reference Only)

4. Max. Conducted Output Power

4.1 Measurement Procedure

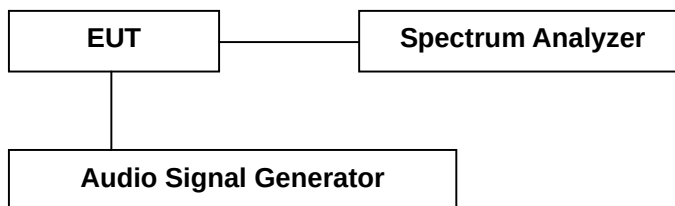
1. The maximum peak output power was measured with a Spectrum analyzer connected to antenna terminal while EUT was operating in unmodulated situation.
2. Power was supplied to the battery input connector a power supply. The power supply was set for +3.0VDC. The spectrum analyzer was connected at antenna terminal to measure RF Power of carrier.
3. A Multimeter was connected in series with final RF stage to measure the current; A multimeter was used to measure final RF stage supply voltage. Then the voltage v.s. current of the final RF stage can be showed.

4.2 Test Limit

Maximum Conducted Output power at Antenna Terminals, FCC Rules 15.236(d):

- (1) In the bands allocated and assigned for broadcast television and in the 600MHz service band: 50mW EIRP.
- (2) In the 600MHz guard bands including the duplex gap: 20mW EIRP

4.3 Test SET-UP (Block Diagram of Configuration)

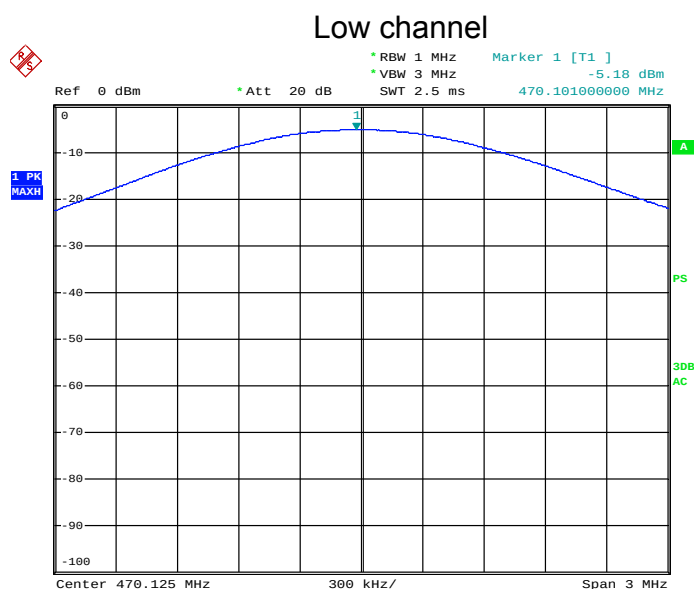


4.4 Measurement Results

Please refer to following table.

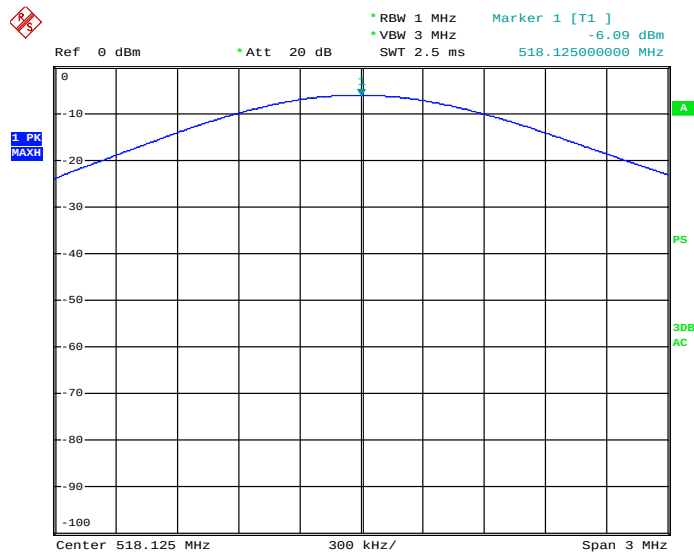
Temperature :	24 °C	Humidity :	50 %
Test By:	Sance	Test Date :	May 09, 2019
Test Result:	PASS		

Frequency MHz	Peak Output Power dBm	Limit dBm
Low Channel: 470.125	-5.18	17
Middle Channel: 518.125	-6.09	17
High Channel: 565.975	-7.14	17



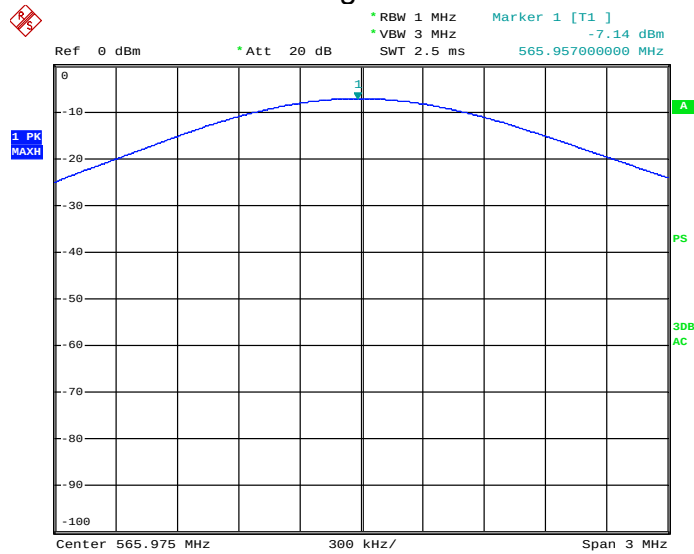
Date: 9.MAY.2019 17:42:51

Middle channel



Date: 9.MAY.2019 17:17:30

High channel



Date: 9.MAY.2019 17:17:16

5. Occupied Bandwidth

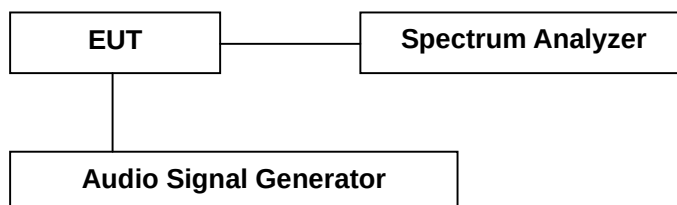
5.1 Measurement Procedure

According to FCC 15.236(f), The operating frequency within a permissible band of operation as defined in paragraph (c) must comply with the following requirements.

- (1) The frequency selection shall be offset from the upper or lower band limits by 25KHz or an integral multiple thereof.
- (2) One or more adjacent 25KHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200KHz. The operating bandwidth shall not exceed 200KHz.

According the ANSI C6.10-2013 section 6.9 for additional test set-up procedure, the occupied bandwidth of emission was measured with a spectrum analyzer connected to the antenna terminal while EUT was operating in 2.5KHz tone at an input level 16dB grater than necessary to produce 50 percent modulation. Then mark the -26dB Bandwidth and record it.

5.2 Test SET-UP (Block Diagram of Configuration)



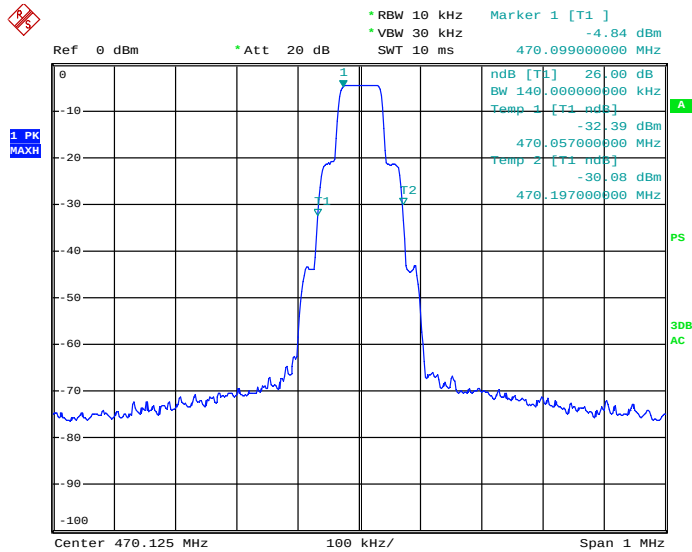
5.3 Measurement Results

Please refer to following table and plots.

Temperature :	22 °C	Humidity :	53 %
Test By:	Sance	Test Date :	May 09, 2019
Test Result:	PASS		

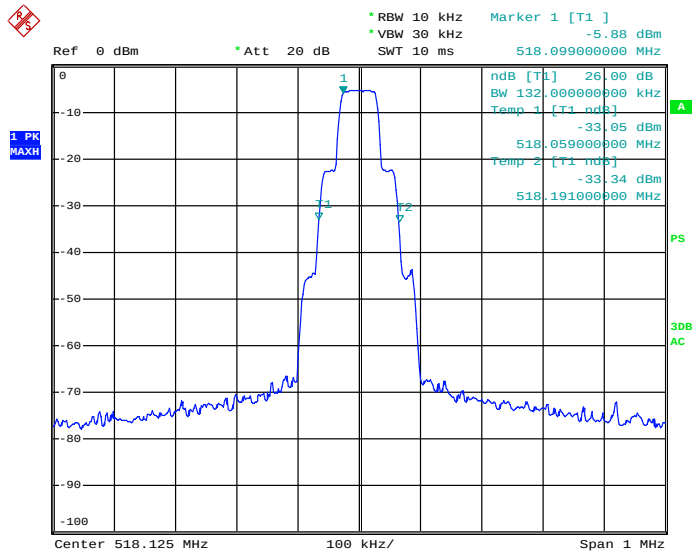
Frequency MHz	99% Bandwidth KHz	26dB Bandwidth KHz	Limit
Low Channel: 470.125	96.00	140.00	<200KHz
Middle Channel: 518.125	92.00	132.00	<200KHz
High Channel: 565.975	92.00	132.00	<200KHz

26dB bandwidth Low Channel



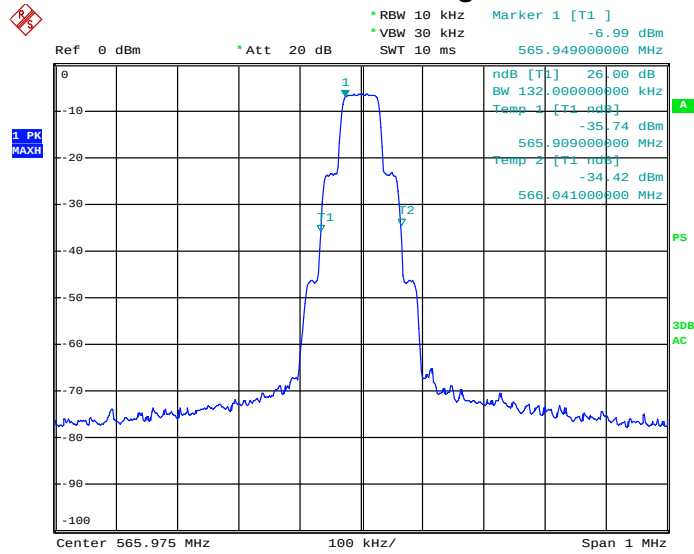
Date: 9.MAY.2019 17:41:58

26dB bandwidth Middle Channel



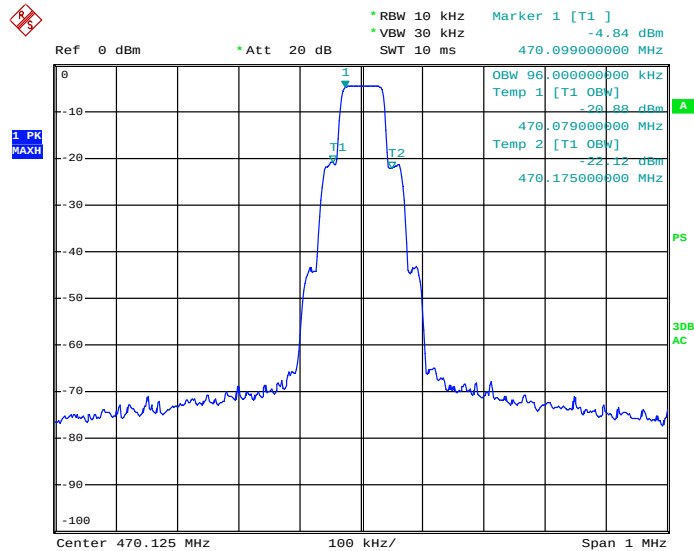
Date: 9.MAY.2019 17:25:39

26dB bandwidth High Channel



Date: 9.MAY.2019 17:23:52

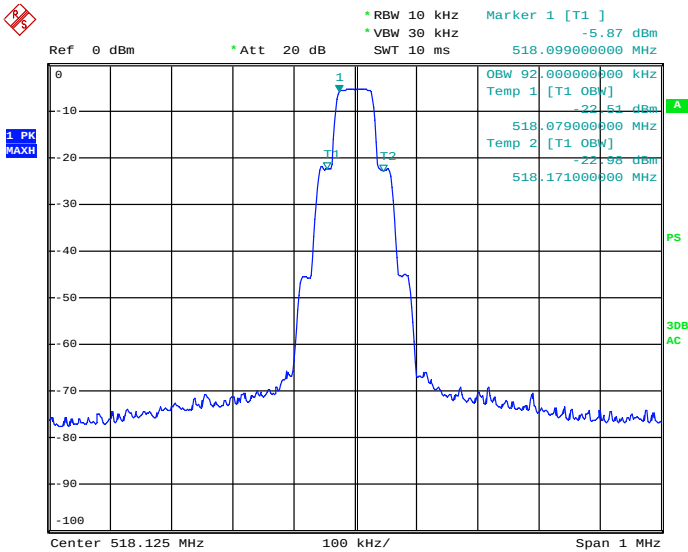
99% bandwidth Low Channel



Date: 9.MAY.2019 17:42:14

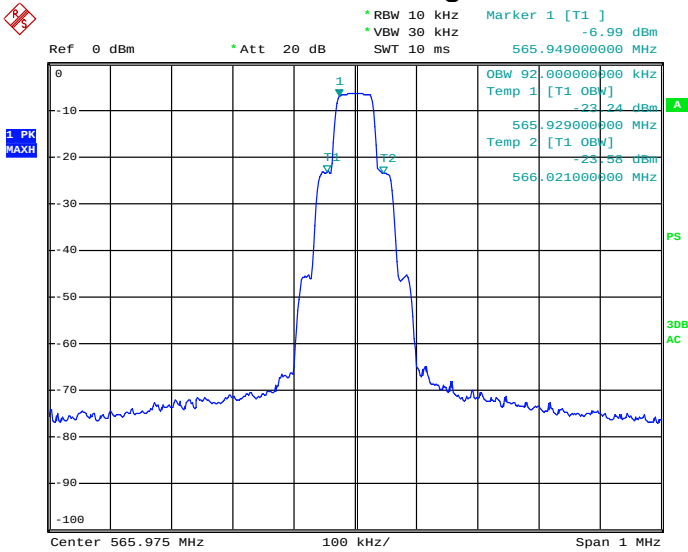


99% bandwidth Middle Channel



Date: 9.MAY.2019 17:25:23

99% bandwidth High Channel



Date: 9.MAY.2019 17:25:02

6. Frequency Stability

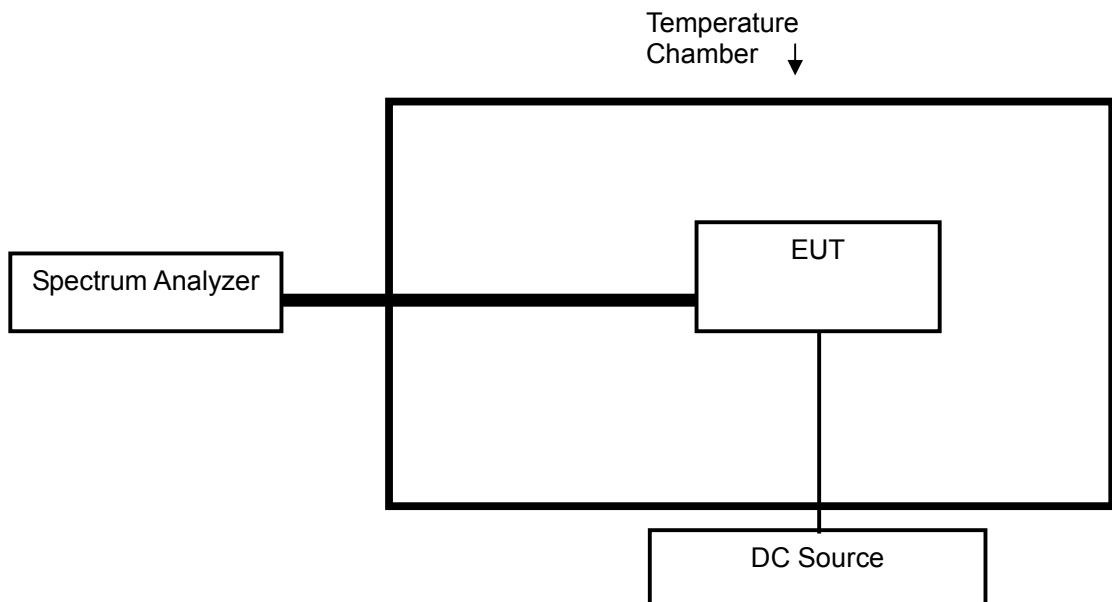
6.1 Measurement Procedure

According to FCC 15.236(f)(3), The frequency tolerance of the carrier signal shall be maintained within $\pm 0.005\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. Battery operated equipment shall be tested using a new battery.

1. Setup the configuration of the ambient temperature from -20 degrees to 50 degrees with sufficient time. And measure the different power of the EUT with an artificial power from highest to end point voltage.
2. Set frequency counter center frequency to the right frequency needs to be measured.

6.2 Test SET-UP (Block Diagram of Configuration)

Test Configuration:



6.3 Measurement Results

Please refer to following table and plots.

Temperature :	22 °C	Humidity :	53 %
Test By:	Sance	Test Date :	May 09, 2019
Test Result:	PASS		

Test conditions		Frequency Error		
Temperature (°C)	Voltage (V)	470.125MHz	518.125MHz	565.975MHz
25	1.5	470.126	518.124	565.974
	1.65	470.126	518.126	565.976
	1.35	470.128	518.126	565.977
-20	1.5	470.127	518.124	565.976
	1.65	470.127	518.127	565.976
	1.35	470.126	518.126	565.974
55	1.5	470.128	518.127	565.975
	1.65	470.127	518.126	565.977
	1.35	470.126	518.126	565.978
Max. frequency error (ppm)		6.38	3.860	5.301
Limit(ppm)		±50ppm		

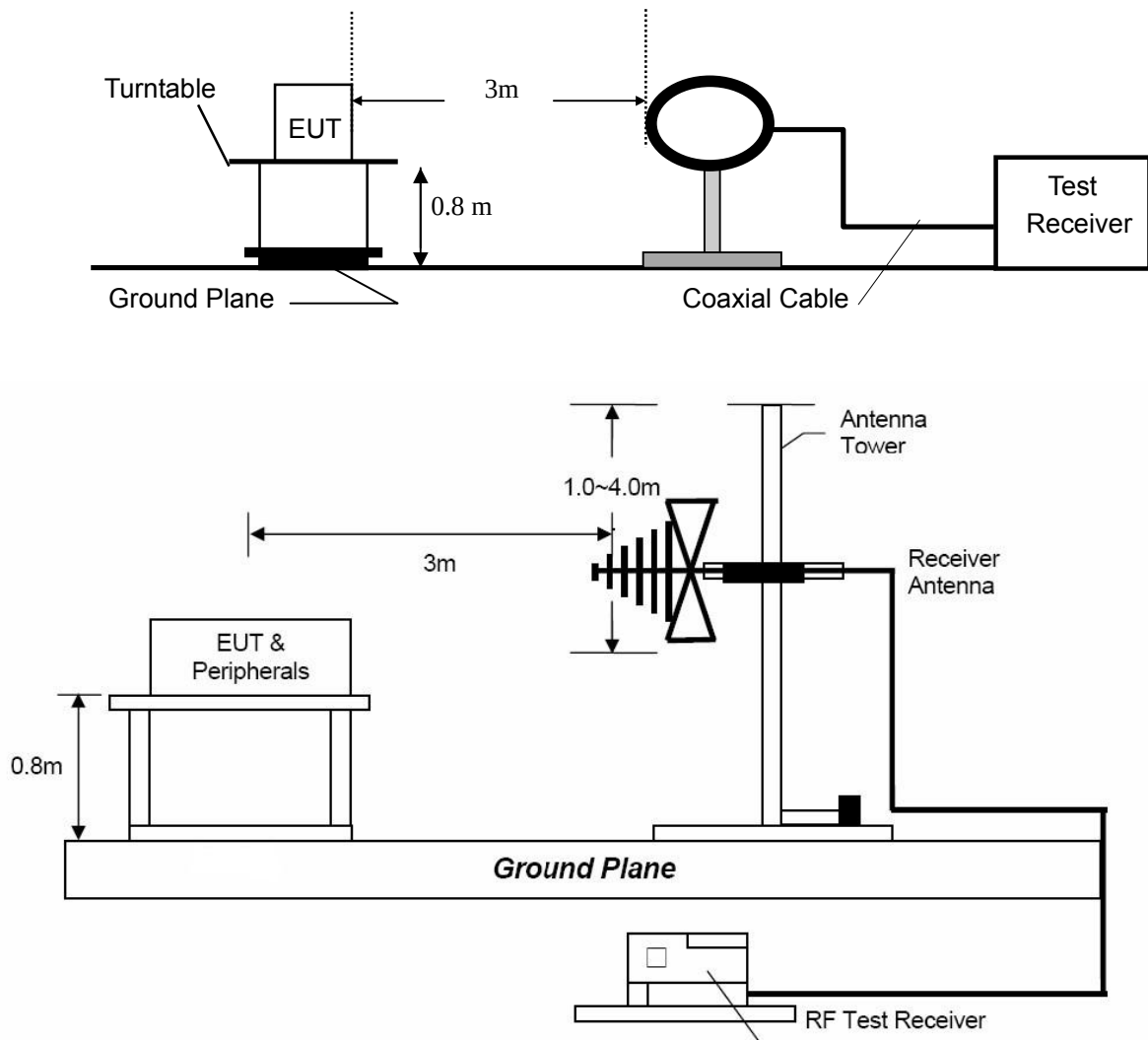
7. Radiated Spurious Emissions & Emission Mask

7.1 Requirement

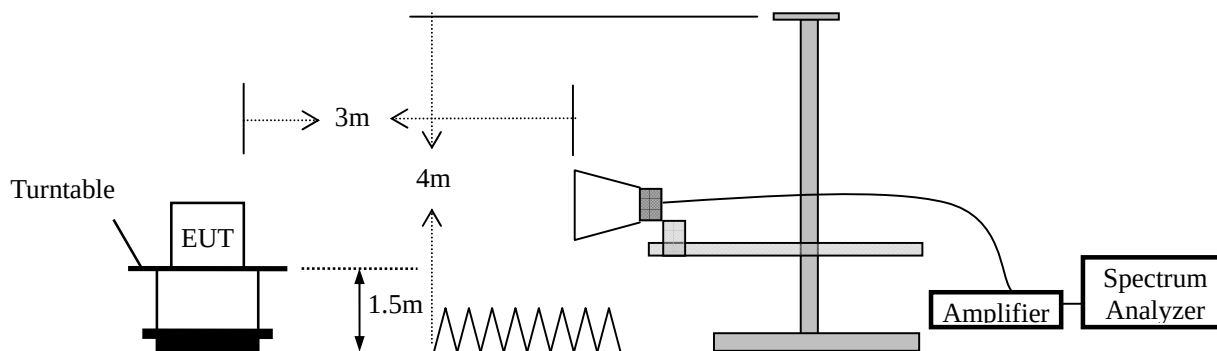
According to FCC 15.236(g), Emission within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in Section 8.3 of ETSI EN 300422-1 V1.4.2(2011-08). Emissions outside this band shall comply with the limit specified at the edges of the ETSI mask.

7.2 Test SET-UP (Block Diagram of Configuration)

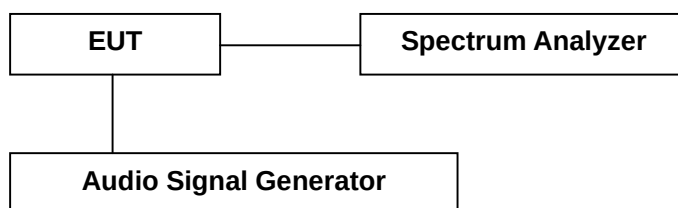
7.2.1 Radiated Emission Test Set-Up, Frequency Below 30MHz



7.2.2 Radiated Emission Test Set-Up, Frequency above 1GHz



7.2.3 Emission Mask Test set-up.



7.3 Measurement Procedure

7.3.1 Radiated spurious emission test procedure:

- a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- b. For the radiated emission test above 1GHz:
The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. Peak and /or AVG for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Level	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz or 30Hz

7.3.2 Emission Mask test procedure:

Necessary Bandwidth (BN) for Analogue Systems Method of Measurement

The arrangement of test equipment as shown in figure B.1 shall be used. Note that the noise meter conforms to (quasi peak) without weighting filter (flat).

With the Low Frequency (LF) audio signal generator set to 500 Hz, the audio input level to the EUT shall be adjusted to 8 dB below the limiting threshold (-8 dB (lim)) as declared by the manufacturer.

The corresponding audio output level from the demodulator shall be measured and recorded.

The input impedance of the noise meter shall be sufficiently high to avoid more than 0,1 dB change in input level when the meter is switched between input and output.

The audio input level shall be increased by 20 dB, i.e. to +12 dB (lim), and the corresponding change in output level shall be measured.

It shall be checked that the audio output level has increased by ≤ 10 dB.

If this condition is not met, the initial audio input level shall be increased from -8 dB (lim) in 1 dB steps until the above condition is fulfilled, and the input level recorded in the test report. This level replaces the value derived from the manufacturer's declaration and is defined as -8 dB (lim).

If the transmitter incorporates more than one audio input, e.g. stereo systems, the second and subsequent channels shall be simultaneously driven from the same noise source, attenuated to a level of -6 dB (lim).

The transmitter RF output spectrum shall be measured, using a spectrum analyser with the following settings:

- | | |
|-------------------------------|---|
| - centre frequency: | fc: Transmitter (Tx) nominal frequency; |
| - dispersion (Span): | fc - 1 MHz to fc + 1 MHz; |
| - Resolution BandWidth (RBW): | 1 kHz; |
| - Video BandWidth (VBW): | 1 kHz; - detector: Peak hold. |

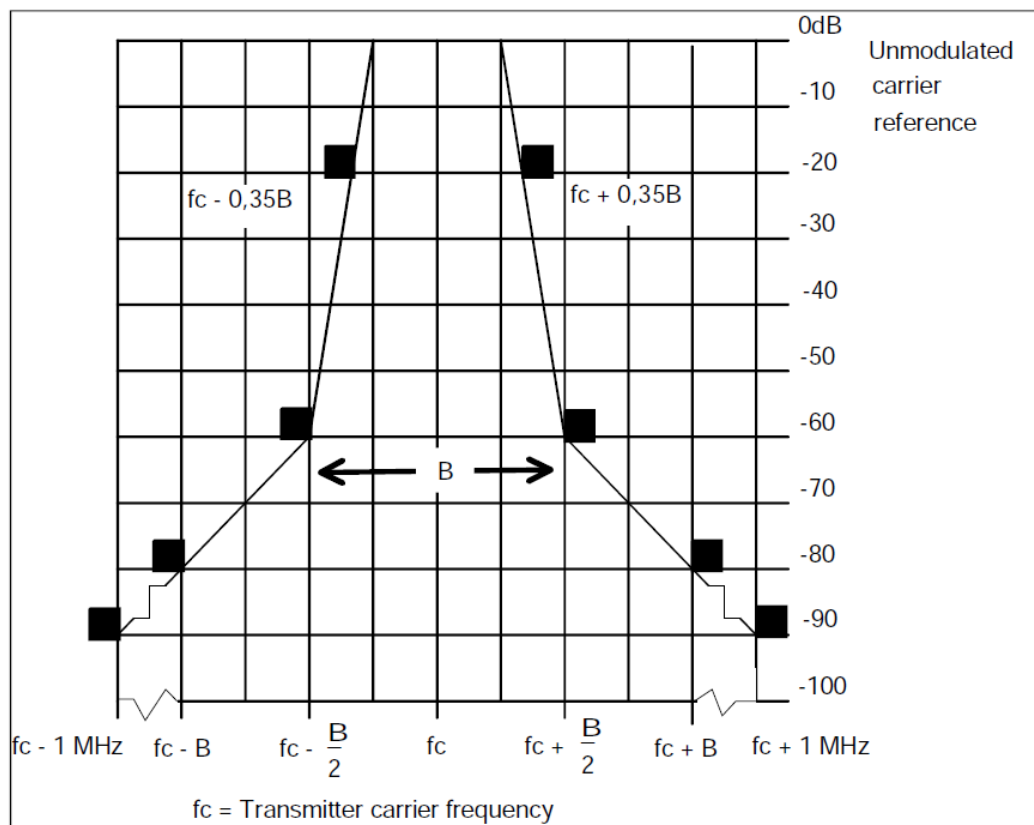
7.4 Limit

Limits for spurious emissions

State	Frequency		
	47MHz to 74MHz 87.5MHz to 137MHz 174MHz to 230MHz 470MHz to 862MHz	Other frequencies Blow 1000MHz	Frequency above 1000MHz
Operation	4nW(-54dBm)	250nW(-36dBm)	1uW(-30dBm)
Standby	2nW(-57dBm)	2nW(-57dBm)	20nW(-57dBm)

Measured valued for equipment in each frequency band must fall below the values given in table above.

Limits for Emission Mask



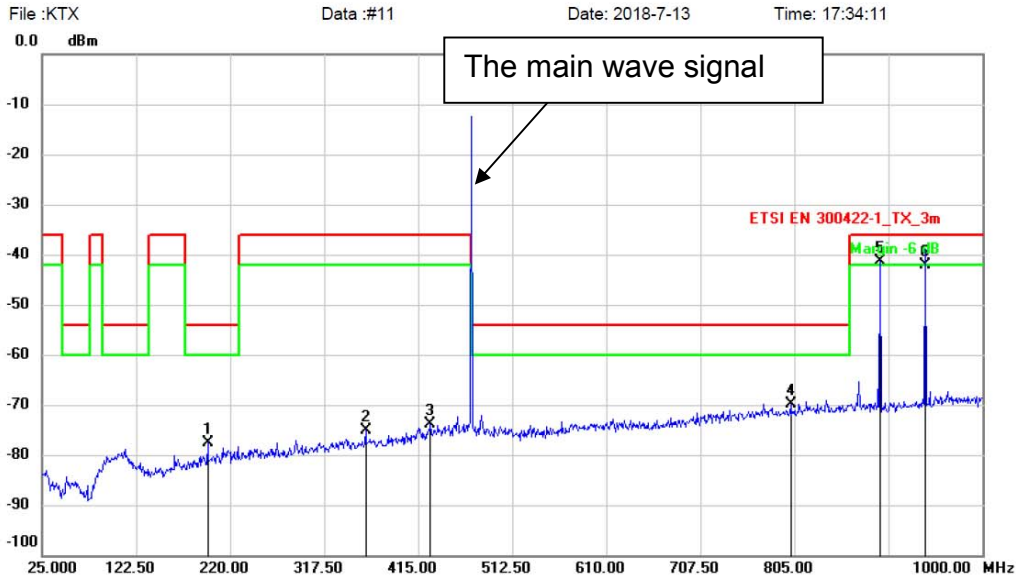
7.5 Measurement Results

Please refer to following plots.



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Radiated Emission Measurement



Site
Limit: ETSI EN 300422-1_TX_3m
EUT: UHF PLL Wireless System
M/N: KTX
Mode: TX
Note: Low

Polarization: **Horizontal** Temperature: 26
Power: DC1.5V Humidity: 47 %
Distance: 3m

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1		196.6000	-76.07	-1.65	-77.72	-54.00	-23.72	QP		
2		360.4000	-77.65	2.62	-75.03	-36.00	-39.03	QP		
3		427.6750	-77.22	3.29	-73.93	-36.00	-37.93	QP		
4		801.1000	-79.63	9.84	-69.79	-54.00	-15.79	QP		
5	*	893.7250	-51.86	10.56	-41.30	-36.00	-5.30	QP		
6		940.5250	-53.51	11.36	-42.15	-36.00	-6.15	QP		

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

(Reference Only)



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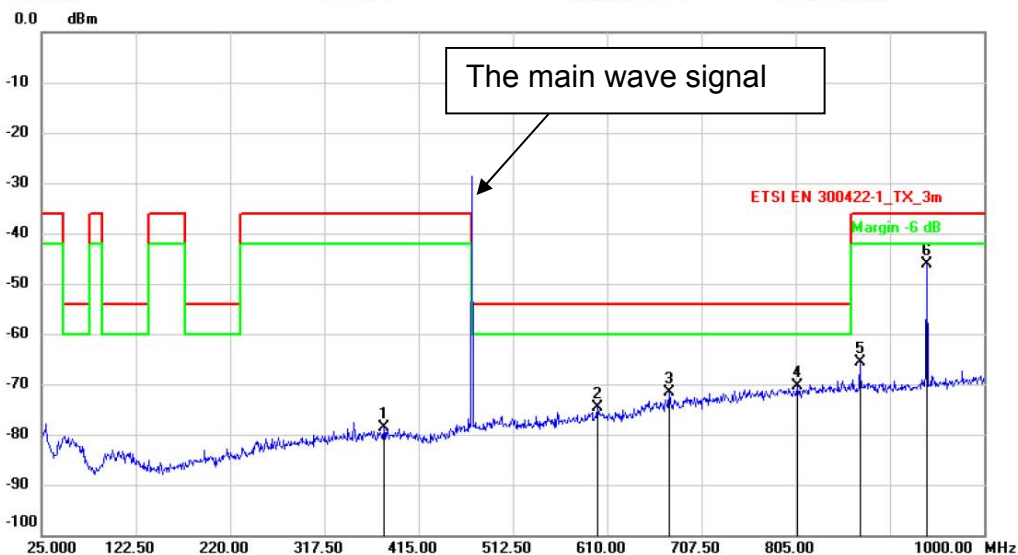
Radiated Emission Measurement

File :KTX

Data :#12

Date: 2018-7-13

Time: 17:36:00



Site
Limit: ETSI EN 300422-1_TX_3m
EUT: UHF PLL Wireless System
M/N: KTX
Mode: TX
Note: Low

Polarization: **Vertical**
Power: DC1.5V
Distance: 3m

Temperature: 26
Humidity: 47 %

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1		378.9250	-79.14	0.58	-78.56	-36.00	-42.56	QP		
2		600.2500	-79.36	4.78	-74.58	-54.00	-20.58	QP		
3		674.3500	-78.79	7.27	-71.52	-54.00	-17.52	QP		
4		806.9500	-80.32	9.95	-70.37	-54.00	-16.37	QP		
5		871.3000	-76.18	10.64	-65.54	-36.00	-29.54	QP		
6	*	940.5249	-57.60	11.36	-46.24	-36.00	-10.24	QP		

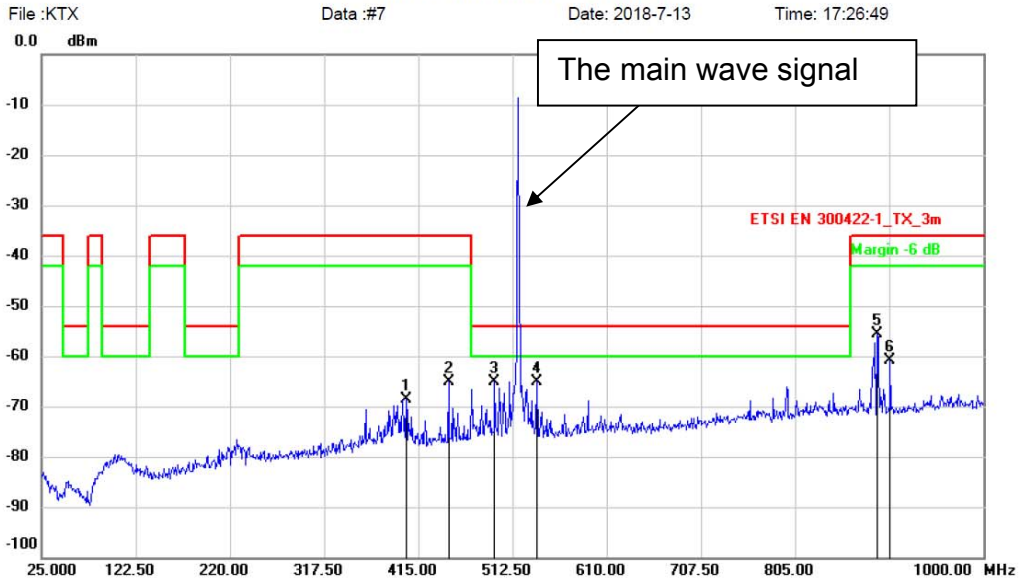
*:Maximum data x:Over limit !:over margin

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Radiated Emission Measurement



Site
Limit: ETSI EN 300422-1_TX_3m
EUT: UHF PLL Wireless System
M/N: KTX
Mode: TX
Note: Mid

Polarization: **Horizontal** Temperature: 26
Power: DC1.5V Humidity: 47 %
Distance: 3m

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1		402.3250	-71.26	2.72	-68.54	-36.00	-32.54	QP		
2		446.2000	-68.88	3.72	-65.16	-36.00	-29.16	QP		
3	*	493.9750	-69.96	4.88	-65.08	-54.00	-11.08	QP		
4		537.8500	-70.24	5.11	-65.13	-54.00	-11.13	QP		
5		889.8250	-66.13	10.58	-55.55	-36.00	-19.55	QP		
6		903.4750	-71.52	10.61	-60.91	-36.00	-24.91	QP		

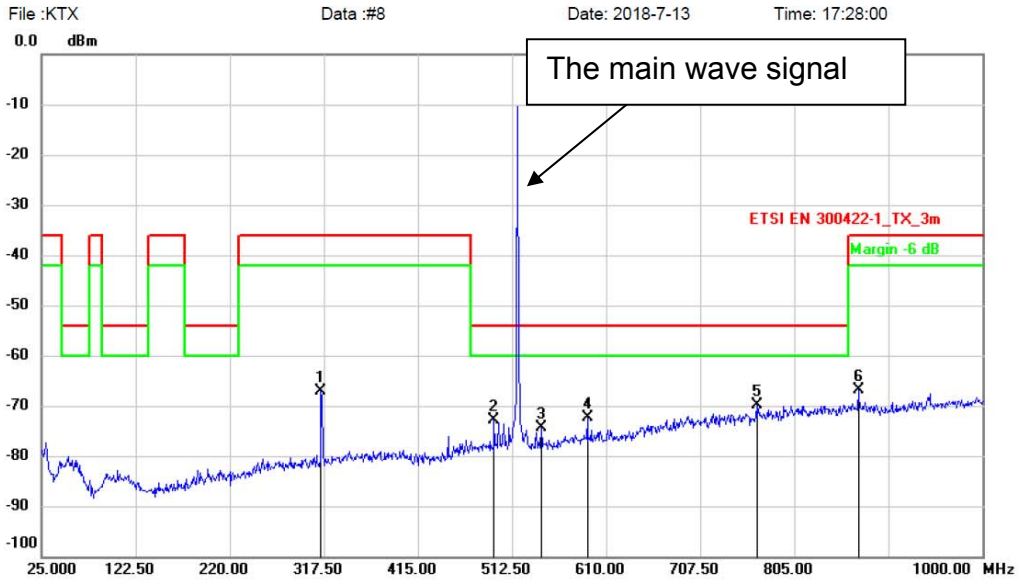
*:Maximum data x:Over limit !:over margin

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Radiated Emission Measurement



Site
Limit: ETSI EN 300422-1_TX_3m
EUT: UHF PLL Wireless System
M/N: KTX
Mode: TX
Note: Mid

Polarization: **Vertical** Temperature: 26
Power: DC1.5V Humidity: 47 %
Distance: 3m

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1		314.5750	-66.86	-0.31	-67.17	-36.00	-31.17	QP		
2		493.9750	-75.84	2.88	-72.96	-54.00	-18.96	QP		
3		542.7250	-77.39	3.13	-74.26	-54.00	-20.26	QP		
4		590.5000	-77.00	4.51	-72.49	-54.00	-18.49	QP		
5	*	766.0000	-79.33	9.39	-69.94	-54.00	-15.94	QP		
6		871.3000	-77.47	10.64	-66.83	-36.00	-30.83	QP		

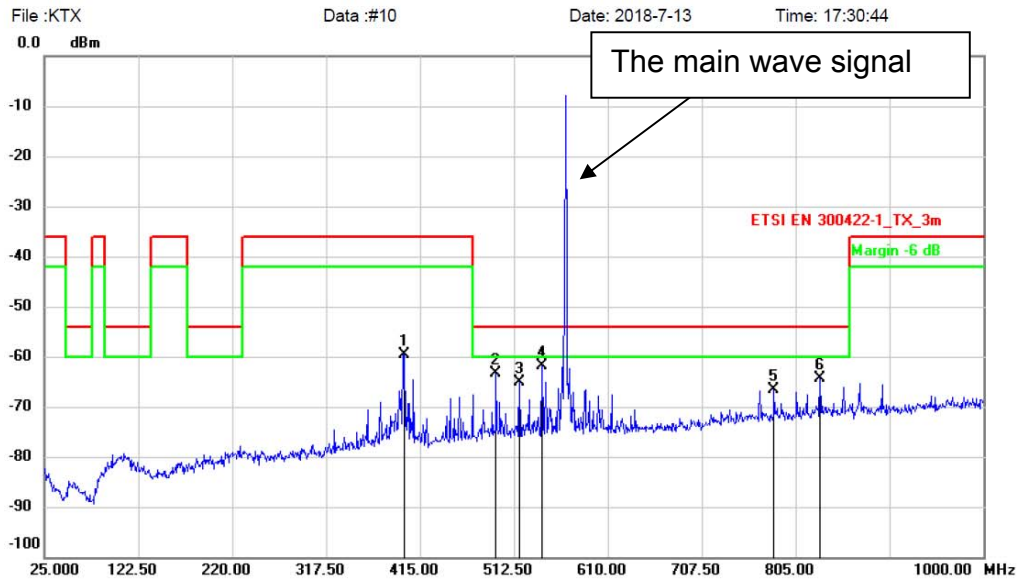
*:Maximum data x:Over limit !:over margin

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Radiated Emission Measurement



Site
Limit: ETSI EN 300422-1_TX_3m
EUT: UHF PLL Wireless System
M/N: KTX
Mode: TX
Note: High

Polarization: **Horizontal** Temperature: 26
Power: DC1.5V Humidity: 47 %
Distance: 3m

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1		398.4250	-62.33	2.66	-59.67	-36.00	-23.67	QP		
2		493.9750	-68.13	4.88	-63.25	-54.00	-9.25	QP		
3		518.3500	-70.07	5.04	-65.03	-54.00	-11.03	QP		
4	*	541.7500	-67.03	5.13	-61.90	-54.00	-7.90	QP		
5		782.5750	-76.31	9.61	-66.70	-54.00	-12.70	QP		
6		830.3500	-74.64	10.33	-64.31	-54.00	-10.31	QP		

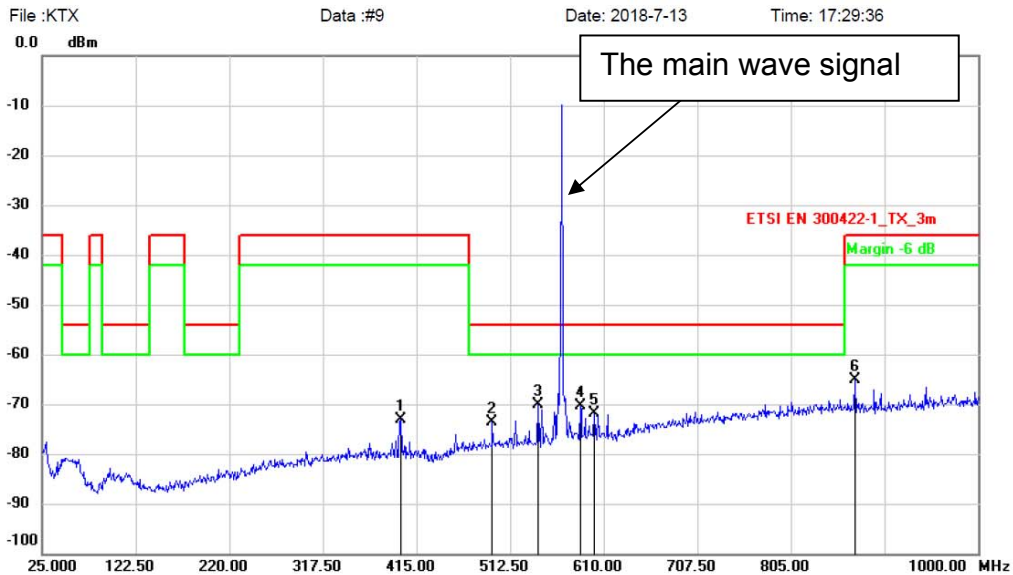
*:Maximum data x:Over limit !:over margin

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Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Radiated Emission Measurement



Site
Limit: ETSI EN 300422-1_TX_3m
EUT: UHF PLL Wireless System
M/N: KTX
Mode: TX
Note: High

Polarization: **Vertical** Temperature: 26
Power: DC1.5V Humidity: 47 %
Distance: 3m

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1		398.4250	-73.70	0.66	-73.04	-36.00	-37.04	QP		
2		493.9750	-76.39	2.88	-73.51	-54.00	-19.51	QP		
3	*	541.7500	-73.21	3.13	-70.08	-54.00	-16.08	QP		
4		585.6250	-74.82	4.37	-70.45	-54.00	-16.45	QP		
5		600.2500	-76.66	4.78	-71.88	-54.00	-17.88	QP		
6		871.3000	-75.68	10.64	-65.04	-36.00	-29.04	QP		

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

<Reference Only

Frequency Range:	1-6GHz	Test Date :	May 10, 2019
Test Result:	PASS	Temperature :	24 °C
Measured Distance:	3m	Humidity :	47 %
Test By:	Sance		

Freq. (MHz)	Ant.Pol. (H/V)	Reading Level(dBm)	Factor (dB/m)	Emission Level (dBm)	Limit 3m (dBm)	Margin (dB)
		Peak		Peak	Peak	
Operation Mode: TX Mode (Low)						
1410.375	V	-43.08	2.98	-40.10	-30.00	-10.10
1880.500	V	-51.74	6.44	-45.30	-30.00	-15.30

1410.375	H	-36.45	2.98	-33.47	-30.00	-3.47
1880.500	H	-42.16	6.44	-35.72	-30.00	-5.72

Operation Mode: TX Mode (Mid)						
1036.250	V	-46.81	0.82	-45.99	-30.00	-15.99
2072.500	V	-56.35	7.59	-48.76	-30.00	-18.76

1036.250	H	-49.24	0.83	-48.41	-30.00	-18.41
2590.625	H	-54.65	9.07	-45.58	-30.00	-15.58

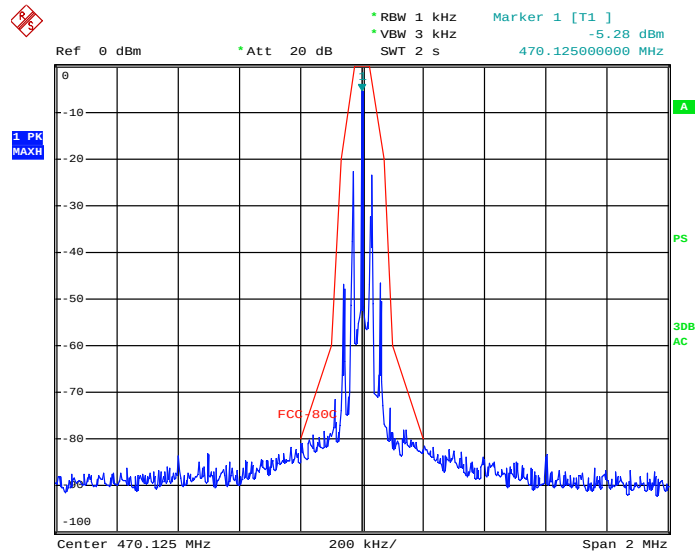
Operation Mode: TX Mode (High)						
2263.900	V	-58.69	8.02	-50.67	-30.00	-20.67
2829.875	V	-62.17	10.04	-52.13	-30.00	-22.13

2263.900	H	-56.65	8.02	-48.63	-30.00	-18.63
2829.875	H	-60.71	10.04	-50.83	-30.00	-20.83

Other harmonics emissions are lower than 10dB below the allowable limit.

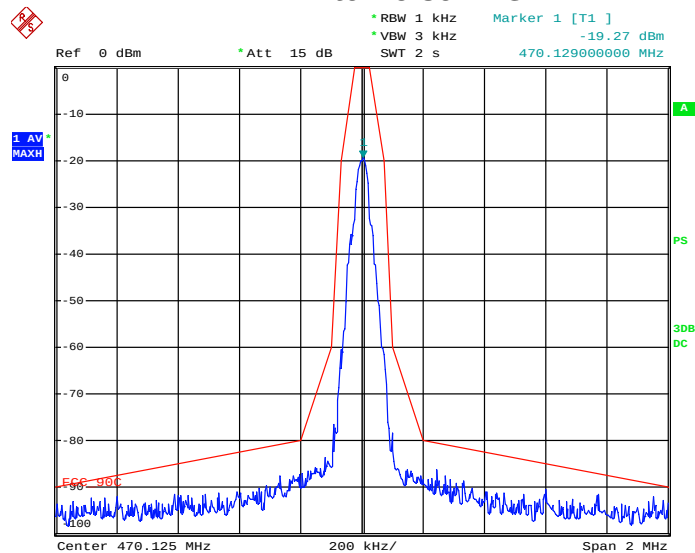
- Note:**
- (1) All Readings is Peak Value.
 - (2) Emission Level= Reading Level + Factor
 - (3) Factor= Antenna Gain + Cable Loss – Amplifier Gain
 - (4) Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
 - (5) Measurement uncertainty : ±3.7dB.
 - (6) Horn antenna used for the emission over 1000MHz.

Mask Emission
Low channel
Un-modulated



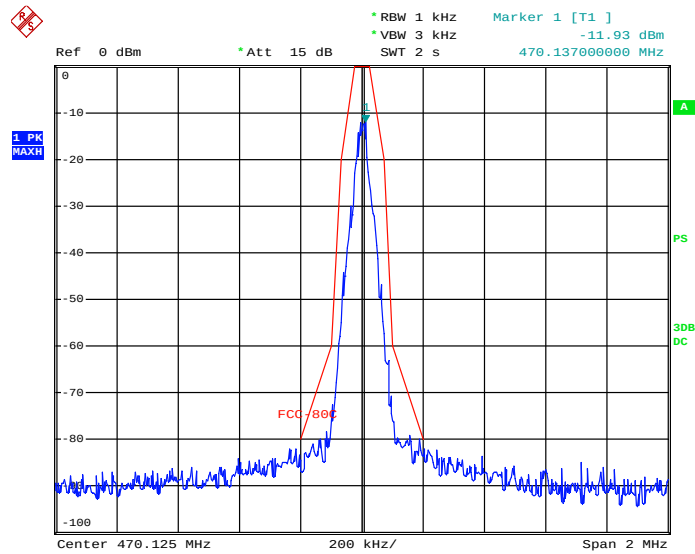
Date: 9.MAY.2019 17:43:39

White Noise AVG



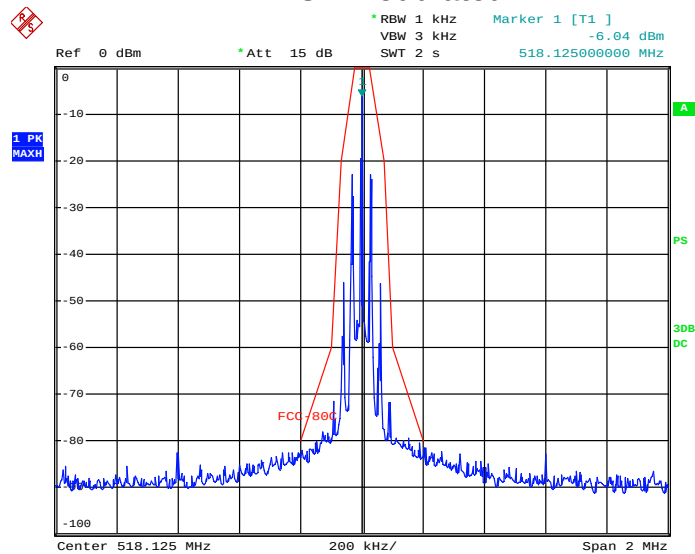
Date: 9.MAY.2019 17:55:55

White Noise Peak



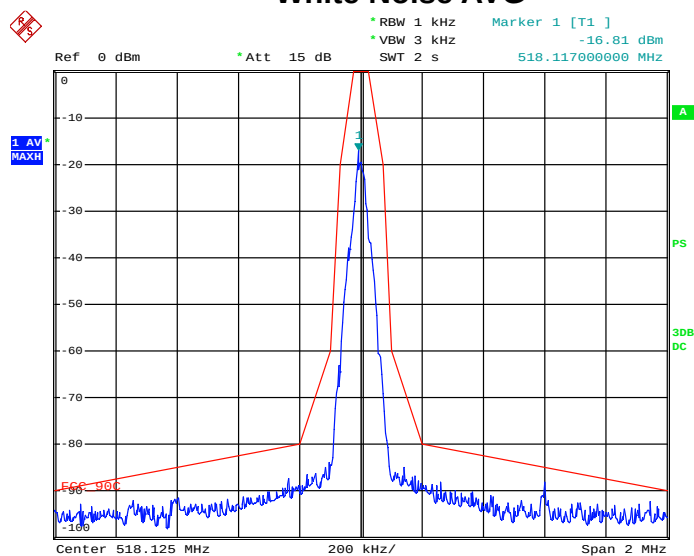
Date: 9.MAY.2019 17:55:27

Middle channel
Un-modulated



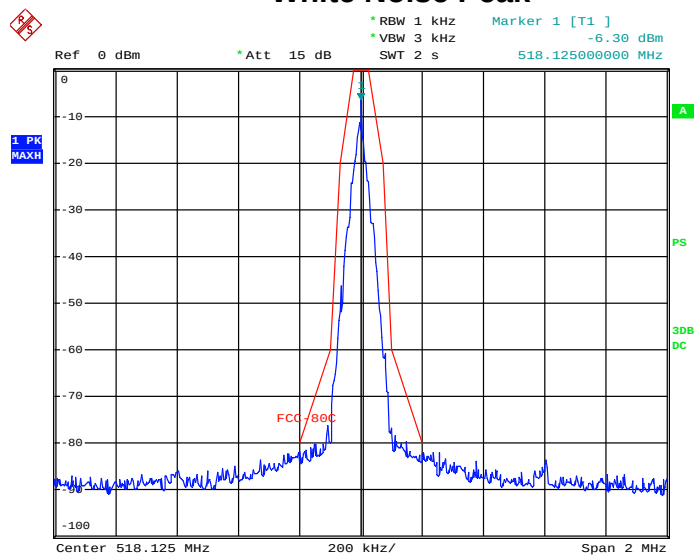
Date: 9.MAY.2019 17:48:58

White Noise AVG



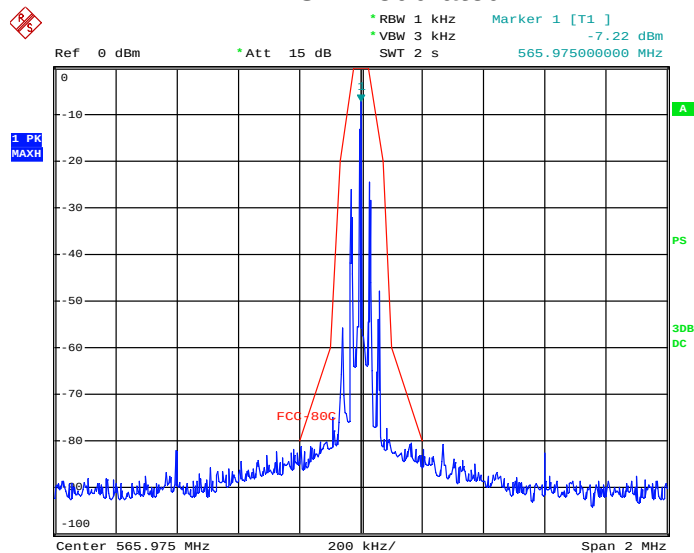
Date: 9.MAY.2019 17:53:55

White Noise Peak



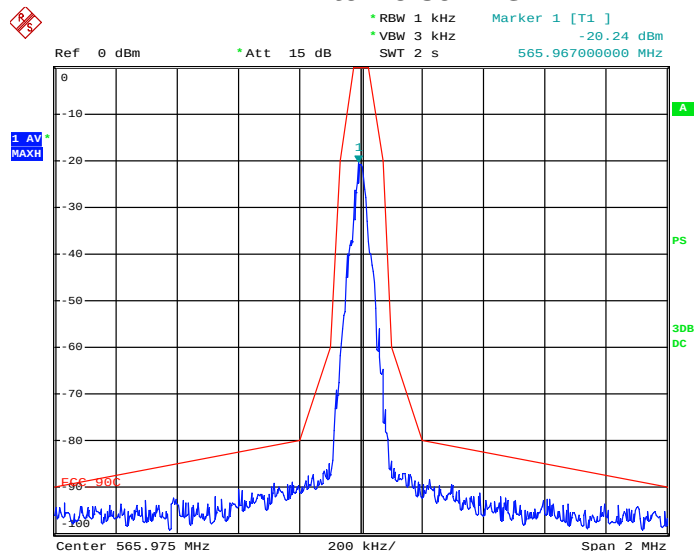
Date: 9.MAY.2019 17:54:30

High channel Un-modulated



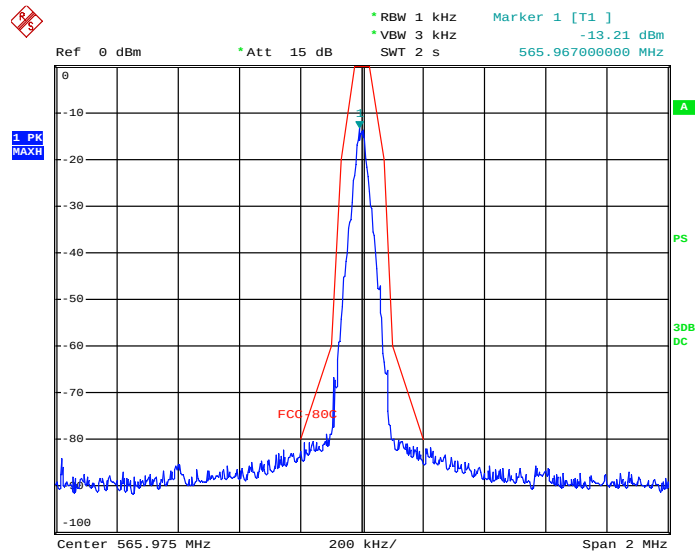
Date: 9.MAY.2019 17:50:55

White Noise AVG



Date: 9.MAY.2019 17:53:33

White Noise Peak



Date: 9.MAY.2019 17:53:17

8. Antenna requirement

8.1 Measurement Procedure

According to of FCC part 15C section 15.203:

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, 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.

Systems operating in the 500-560.9MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

8.2 Measurement Results

The antenna is integral antenna and no consideration of replacement, and the best case gain of the antenna is 0dBi. So, the antenna is consider meet the requirement.

9. Test Equipment List

Description	Manufacturer	Model Number	Serial Number	Characteristics	Calibration Date	Calibration Due Date
Test Receiver	Rohde & Schwarz	ESCI7	100837	9KHz~7GHz	Mar. 14, 2019	Mar. 13, 2020
Antenna	Schwarzbeck	VULB9162	9162-010	30MHz~7GHz	Mar. 23, 2019	Mar. 22, 2020
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	20Hz~26.5GHz	Mar. 14, 2019	Mar. 13, 2020
Spectrum Analyzer	Keysight	N9020A	MY54200831	20Hz~26.5GHz	Apr. 24, 2019	Apr. 23, 2020
Spectrum Analyzer	Rohde & Schwarz	FSV40	101003	10Hz~40GHz	Apr. 24, 2019	Apr. 23, 2020
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	15GHz~40GHz	Mar. 23, 2019	Mar. 22, 2020
Pre-Amplifier	EMCI	EMC 184045	980102	18GHz~40GHz	Apr. 24, 2019	Apr. 23, 2020
Power Sensor	DARE	RPR3006W	15100041SN O64	100MHz~6GHz	Mar. 14, 2019	Mar. 13, 2020
Communication Tester	Rohde & Schwarz	CMW500	149004	70MHz~6GHz	Mar. 14, 2019	Mar. 13, 2020
Horn Antenna	COM-Power	AH-118	071078	500MHz~18GHz	Mar. 23, 2019	Mar. 22, 2020
Pre-Amplifier	HP	HP 8449B	3008A00964	1GHz~26.5GHz	Mar. 14, 2019	Mar. 13, 2020
Pre-Amplifier	HP	HP 8447D	1145A00203	100KHz~1.3GHz	Mar. 14, 2019	Mar. 13, 2020
Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	9KHz~30MHz	Apr. 24, 2019	Apr. 23, 2020
Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	-40~150℃	Apr. 24, 2019	Apr. 23, 2020
DC Source	MY	MY8811	N/A	0~30V	N/A	N/A
Temporary antenna connector	TESCOM	SS402	N/A	9KHz~25GHz	N/A	N/A
Power Meter	Anritsu	ML2495A	1139001	100k-65GHz	Apr. 24, 2019	Apr. 23, 2020
Power Sensor	Anritsu	MA2411B	100345	300M-40GHz	Apr. 24, 2019	Apr. 23, 2020
Test Software	EZ	EZ_EMC	N/A	N/A	N/A	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

---End---