FCC REPORT

Applicant:	Alligator Communications, Inc.
Address of Applicant:	1400 Coleman Ave., Santa Clara, CA 95050
Equipment Under Test (EUT)	
Product Name:	150-174 MHz MAS Licensed Radio
Model No.:	2188
FCC ID:	JIL2188
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 90 Subpart I
Date of sample receipt:	26 Aug., 2019
Date of Test:	27 Aug., to 29 Aug., 2019
Date of report issued:	11 Oct., 2019
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2. Version

Version No.	Date	Description
00	*30 Aug., 2019*	*Original*
01	*24 Sep., 2019*	*Remove 25KHz BW test data, Add Transient frequency behaviour, Update page 8*
02	*11 Oct., 2019*	*Update page 7, 18, 25, 26*

Tested by: Mike.ou ***Date:*** *11 Oct., 2019*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *11 Oct., 2019*

Project Engineer

3. Contents

4. Test Summary

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 90.259 (b)(1)	Pass
Types of emissions	Part 2.1047 Part 90.207	Pass
Occupied Bandwidth	Part 2.1049 Part 90.209	Pass
Emission masks	Part 90.210	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051	Pass
Field Strength of Spurious Radiation	Part 2.1053	Pass
Frequency stability	Part 2.1055 Part 90.213	Pass
Transient frequency behavior	Part 90.214	Pass
Pass: The EUT complies with the essential requirements in the standard.		

5. General Information

5.1 Client Information

Applicant:	Alligator Communications, Inc.
Address:	1400 Coleman Ave., Santa Clara, CA 95050
Manufacturer/ Factory:	Alligator Communications, Inc.
Address:	1400 Coleman Ave., Santa Clara, CA 95050

5.2 General Description of E.U.T.

Product Name:	150-174 MHz MAS Licensed Radio
Model No.:	2188
Operation Frequency range:	150 MHz-174 MHz
Modulation type:	4GFSK
Antenna type:	External antenna (“N” type)
Antenna gain:	0 dBi
Power supply:	Operating Voltage Scope: 12V DC to 24V DC Normal test voltage: 12V DC.

Operation Frequency of Test Channel		
Test Channel	Bandwidth =6.25 (kHz)	Bandwidth = 12.5 (kHz)
Lowest channel	150.00325MHz	150.00625MHz
Middle channel	162.00000MHz	162.00000MHz
Highest channel	173.99675 MHz	173.99375 MHz

5.3 Test modes

Operating Environment:	
Temperature:	Normal: 15℃ ~ 35℃, Extreme: -30℃ ~ +50℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 12Vdc, Extreme: Low 10.2 Vdc, High 27.6 Vdc
Test mode:	
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation.

5.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
Lenovo	PC	ThinkPad-E450	2014AP5917	/
GS Japan	Lead-acid battery	55D26R-MFZ	8362810610	N/A

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±2.88 dB (k=2)

5.6 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.7 Laboratory Location

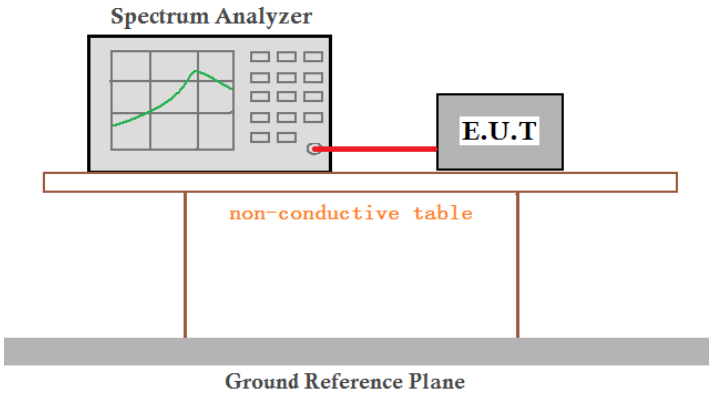
Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.8 Test Instruments list

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Biconical Antenna	SCHWARZBECK	VUBA9117	359	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-10-2018	11-09- 2019
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019
Signal Generator	Rohde & Schwarz	SMX	835454/016	03-18-2019	03-17-2020
Signal Generator	R&S	SMR20	1008100050	03-18-2019	03-17-2020
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
DC Power Supply	XinNuoEr	WYK-10020K	1409050110020	10-31-2018	10-30-2019
Temperature Humidity Chamber	HengPu	HPGDS-500	20140828008	09-24-2018	09-23-2019
Oscilloscope	Tektronix	TDS5054B	B021436	09-25-2018	09-25-2019
				09-25-2019	09-24-2018
Power Sensor	D.A.R.E	RPR3006W	15I00041SNO12	11-10-2018	11-09- 2019
Power Sensor	D.A.R.E	RPR3006W	15I00041SNO54	11-10-2018	11-09- 2019

6. Test results

6.1 RF Output Power

Test Requirement:	FCC part 90.259(a)(4)
Test Method:	ANSI/TIA-603-D 2010
Limit:	TABLE 1—150-174MHz—MAXIMUM ERP/REFERENCE HAAT FOR A SPECIFIC SERVICE AREA RADIUS Service area radius (km): 3 / 8 / 13 / 16 / 24 / 32 / 40 / 48[4] / 64[4] / 80[4] Maximum ERP (w)[1]: 1 / 28 / 178 / 2500 / 2500 / 2500 / 500 / 2500 / 2500 / 2500 Up to reference HAAT (m)[3]: 15 / 15 / 15 / 15 / 33 / 65 / 110 / 160 / 380 / 670
Test setup:	
	1. The EUT output RF connector was connected with a short cable to the spectrum analyzer. 2. Spectrum analyzer was set: RBW= 1MHz, VBW= 3 times RBW. 3. Use peak marker function to determine the peak amplitude level.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

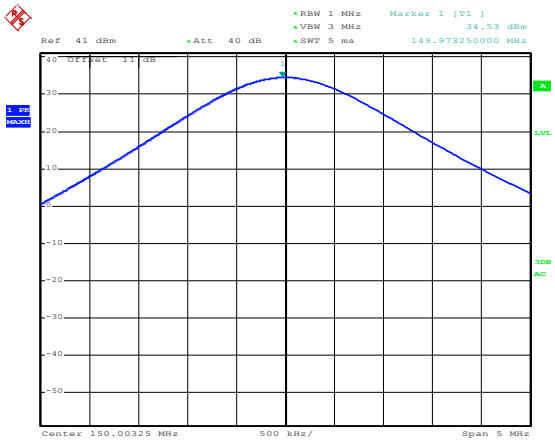
Measurement Data:

Bandwidth (kHz)	Test Channel	Conducted Output Power (dBm)	ANT Gain (dBi)	EPR (dBm)	ERP Limit (dBm)
6.5K	Lowest channel	34.53	0	32.38	57.00
	Middle channel	34.68	0	32.53	
	Highest channel	33.79	0	31.64	
12.5K	Lowest channel	34.54	0	32.39	
	Middle channel	34.65	0	32.50	
	Highest channel	33.83	0	31.68	

NOT:
EUT Service area radius (24km),
EIRP= Conducted Output Power + ANT Gain, ERP=EIRP-2.15

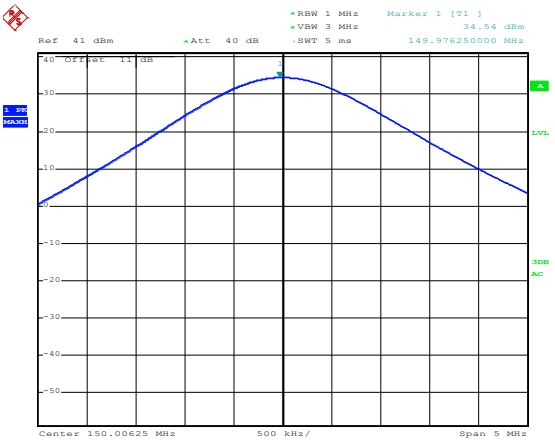
Test plot as follows:

6.25K
Lowest channel



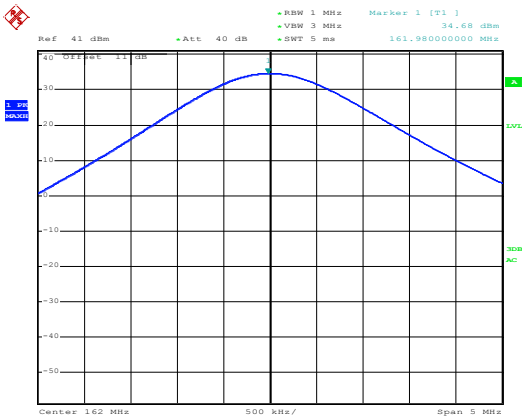
Date: 27.AUG.2019 10:06:13

12.5K
Lowest channel



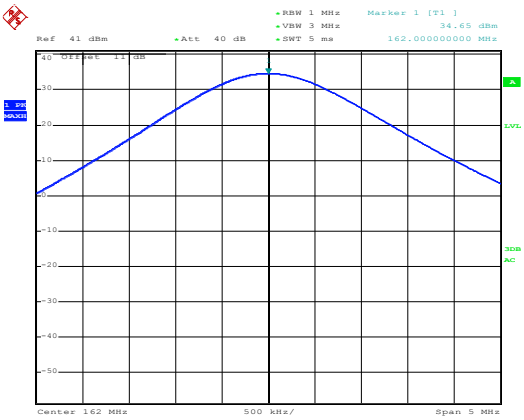
Date: 27.AUG.2019 09:58:50

Middle channel



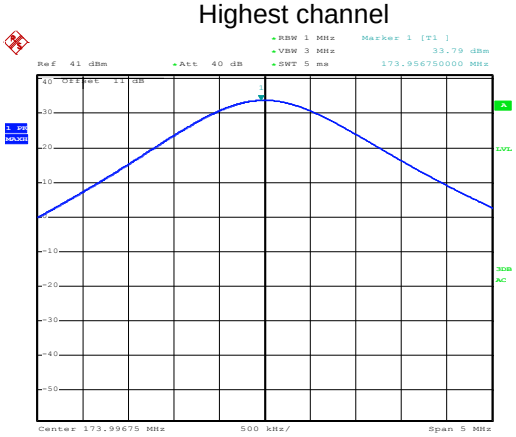
Date: 27.AUG.2019 10:07:07

Middle channel



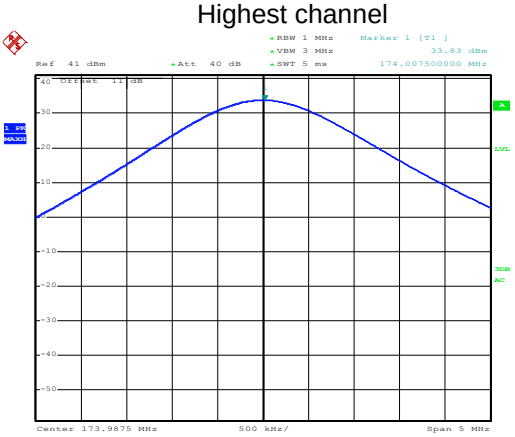
Date: 27.AUG.2019 10:00:09

Highest channel



Date: 27.AUG.2019 10:07:56

Highest channel

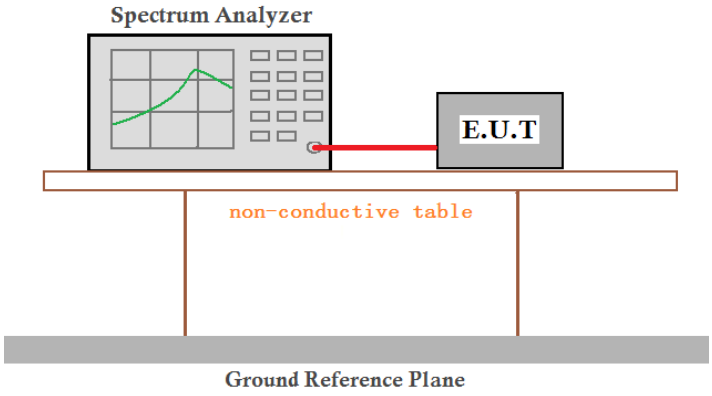


Date: 27.AUG.2019 10:01:16

6.2 Types of emissions

CHANNEL SPACING	SYMBOL RATE	TX FREQ DEVIATION	EMISSION DESIGNATOR
6.25k	sr = 1200	td = 600	4K0F1D
12.5 kHz	sr = 4800	td = 2400	11k2F1D

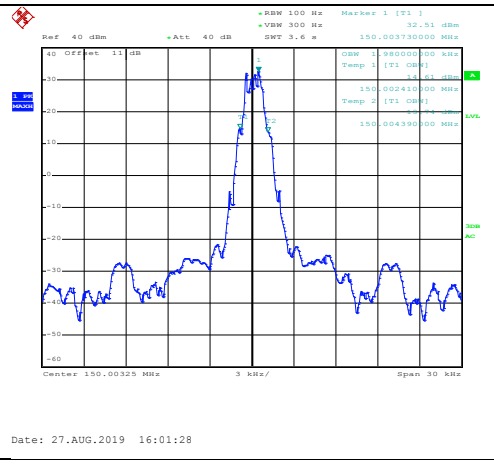
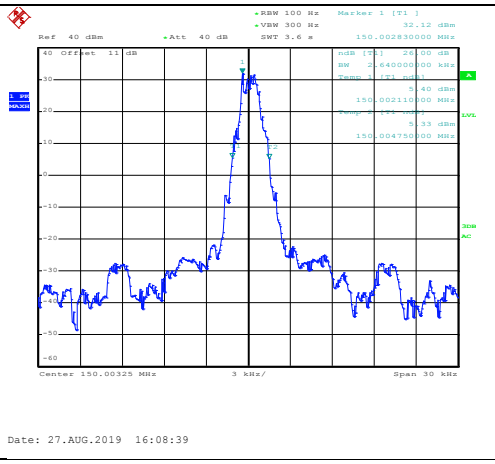
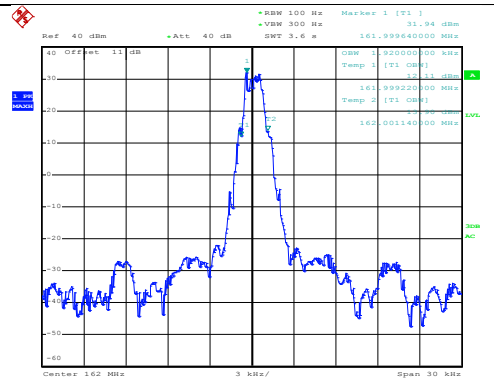
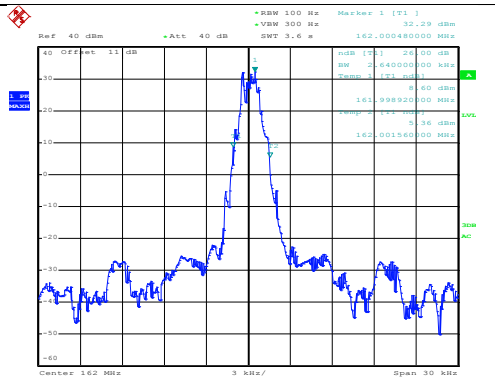
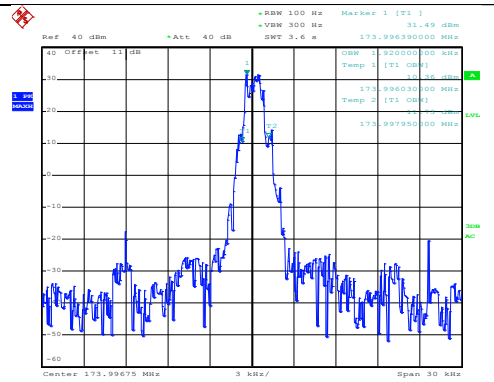
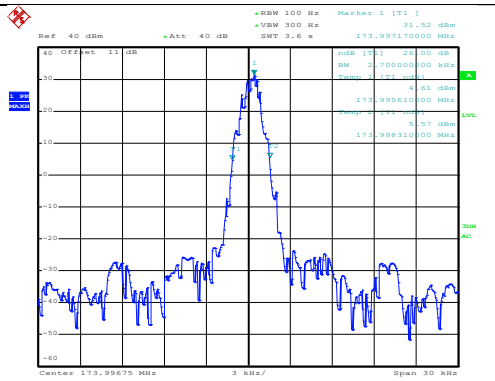
6.3 Occupied Bandwidth

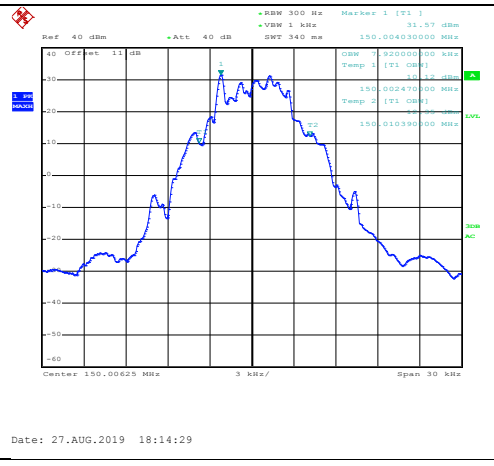
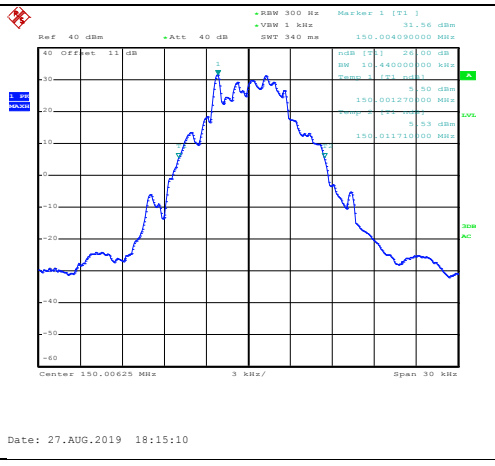
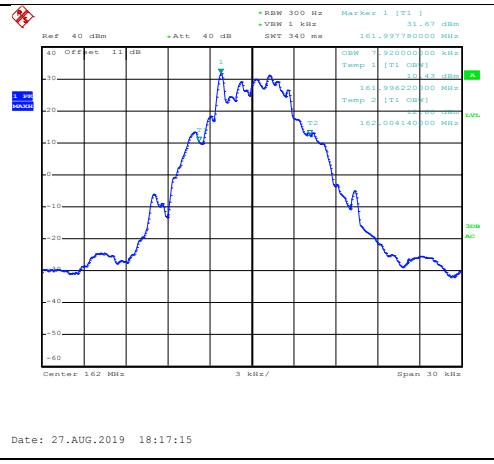
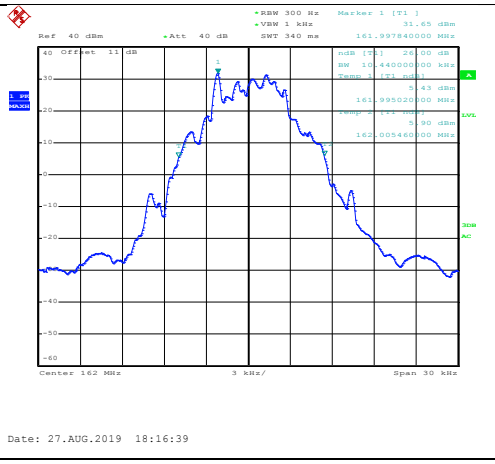
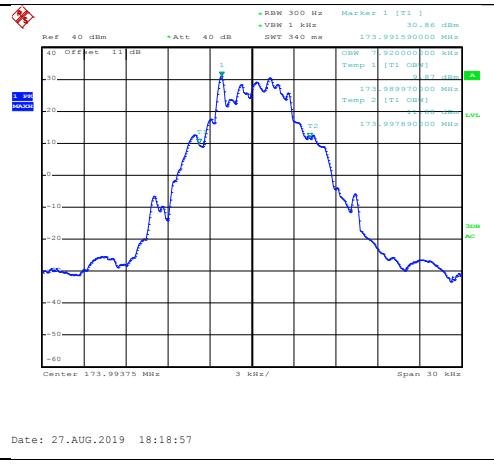
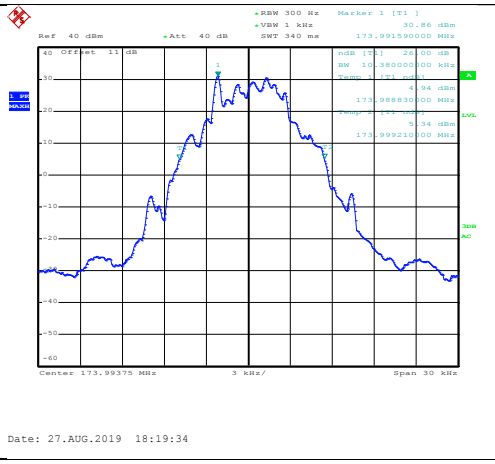
Test Requirement:	FCC part 90.209
Test Method:	ANSI/TIA-603-D 2010
Test setup:	
Test Procedure:	1. The EUT output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. 99% bandwidth display line was placed on the screen, the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

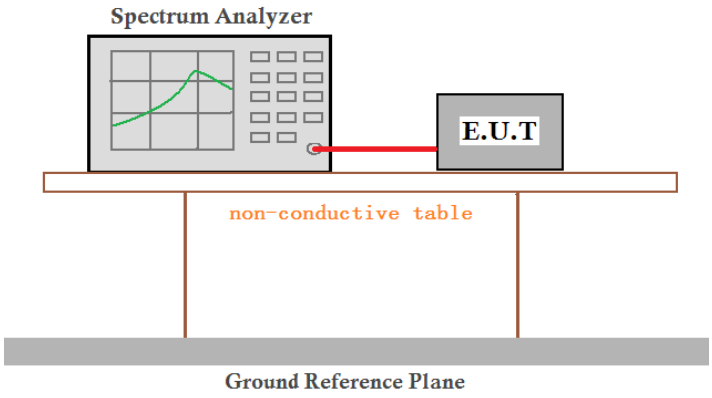
Bandwidth Channel (kHz)	Test Channel	99% Occupy bandwidth (kHz)	-26dB bandwidth (kHz)	Limit (kHz)
6.25	Lowest channel	1.98	2.64	6
	Middle channel	1.92	2.64	6
	Highest channel	1.92	2.70	6
12.5	Lowest channel	7.92	10.44	11.25
	Middle channel	7.92	10.44	11.25
	Highest channel	7.92	10.38	11.25

Test plot as follows:

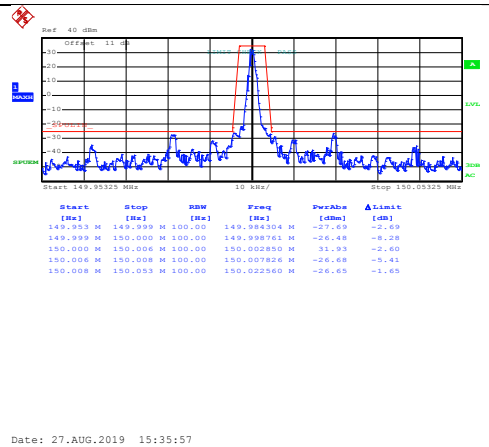
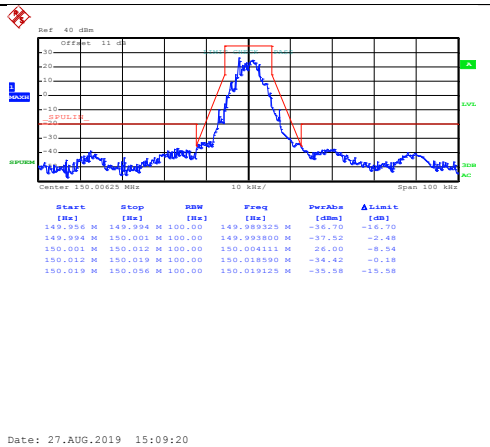
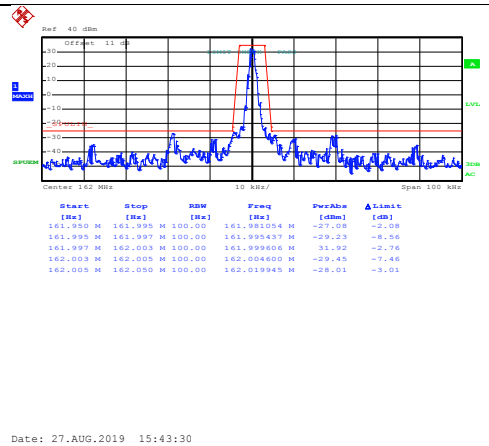
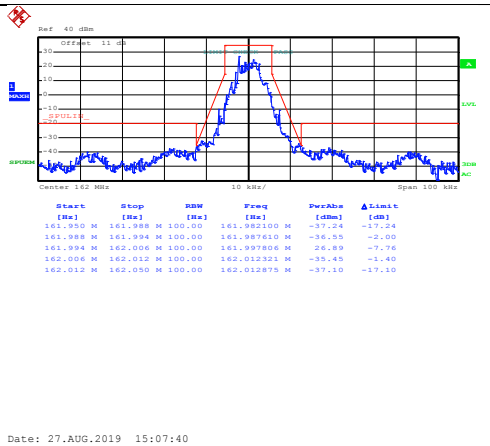
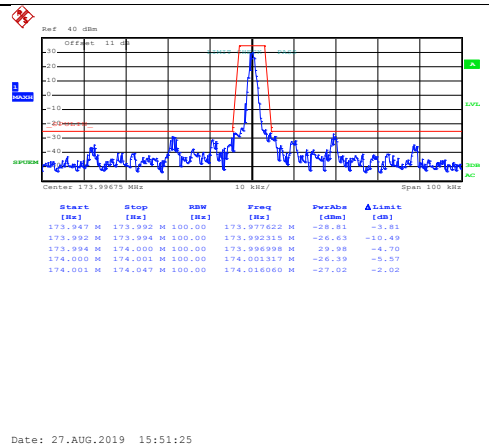
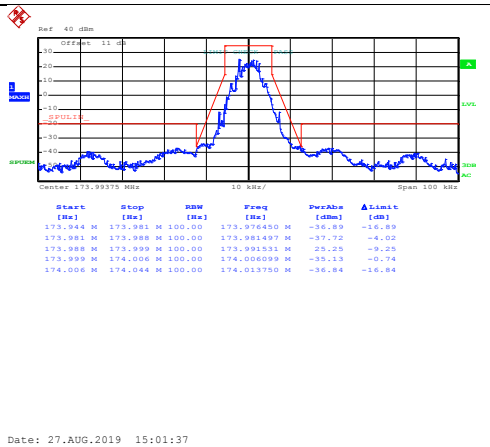
Channel Bandwidth = 6.25 kHz	
99%	**26dB**
	
Date: 27.AUG.2019 16:01:28	Date: 27.AUG.2019 16:08:39
Lowest channel	Lowest channel
	
Date: 27.AUG.2019 16:03:38	Date: 27.AUG.2019 16:05:51
Middle channel	Middle channel
	
Date: 27.AUG.2019 18:04:33	Date: 27.AUG.2019 17:38:36
Highest channel	Highest channel

Channel Bandwidth = 12.5 kHz	
99%	**26dB**
	
Lowest channel	Lowest channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

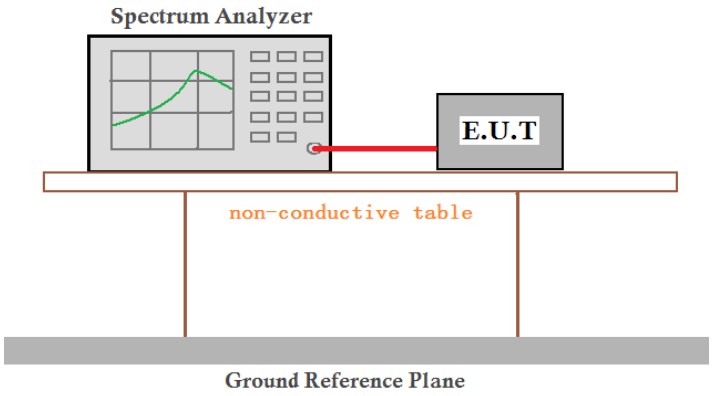
6.4 Emission Masks

Test Requirement:	FCC part 90.210
Test Method:	ANSI/TIA-603-D 2010
Limit:	**Emission Mask D—12.5 kHz** channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows: (1) On any frequency from the center of the authorized bandwidth f0 to 5.625 kHz removed from f0: Zero dB. (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least 7.27(fd−2.88 kHz) dB. (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 12.5 kHz: At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation. **Emission Mask E—6.25 kHz** or less channel bandwidth equipment. For transmitters designed to operate with a 6.25 kHz or less bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows: (1) On any frequency from the center of the authorized bandwidth f0 to 3.0 kHz removed from f0: Zero dB. (2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 3.0 kHz but no more than 4.6 kHz: At least 30 + 16.67(fd−3 kHz) or 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation. (3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least 55 + 10 log (P) or 65dB, whichever is the lesser attenuation.
Test setup:	
Test Procedure:	1. The EUT output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= RBW. 3. Trace mode = max hold.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

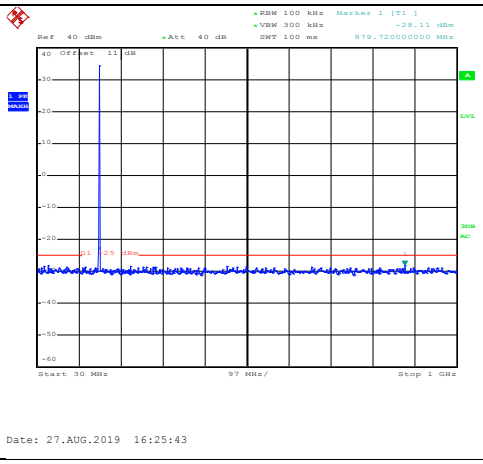
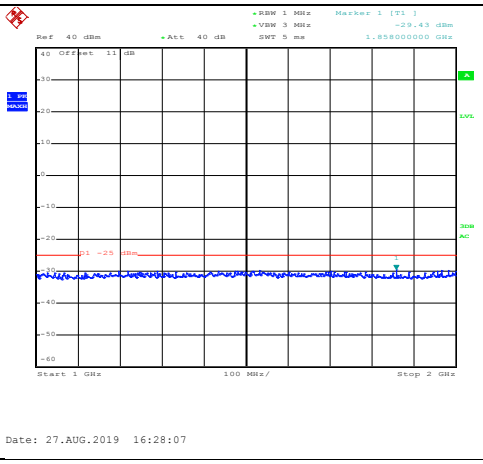
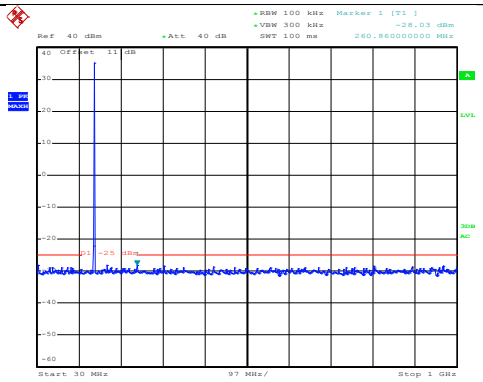
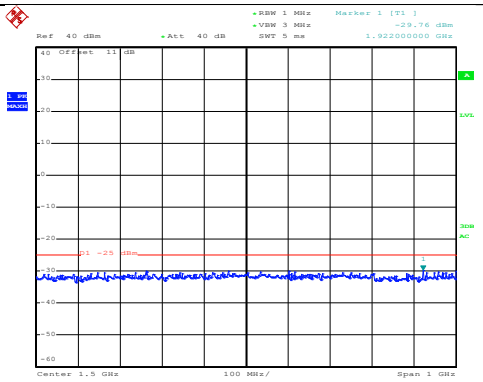
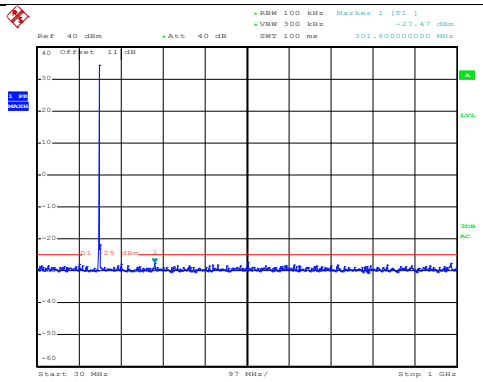
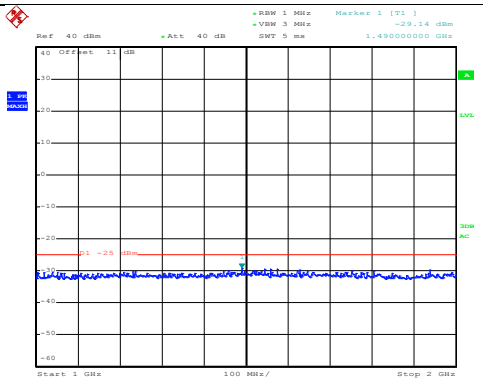
Test plot as follows:

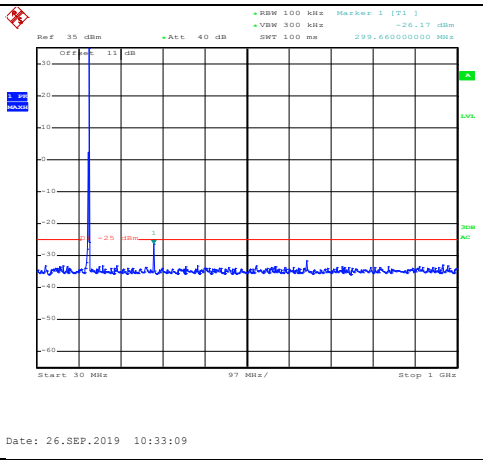
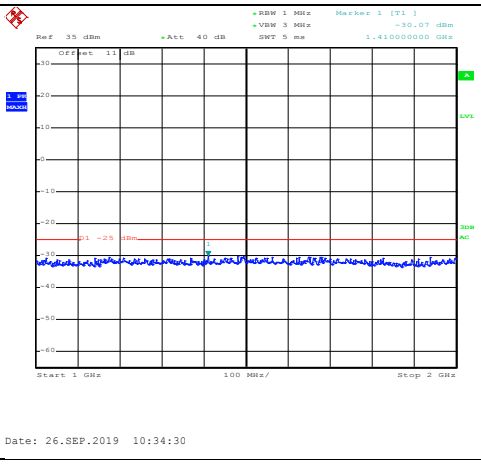
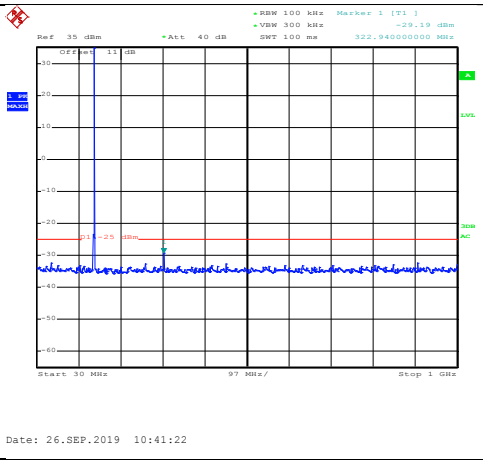
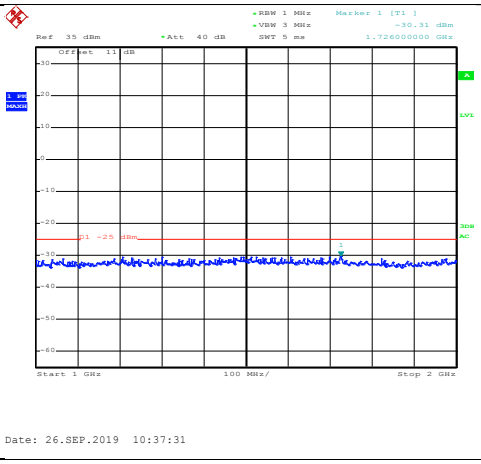
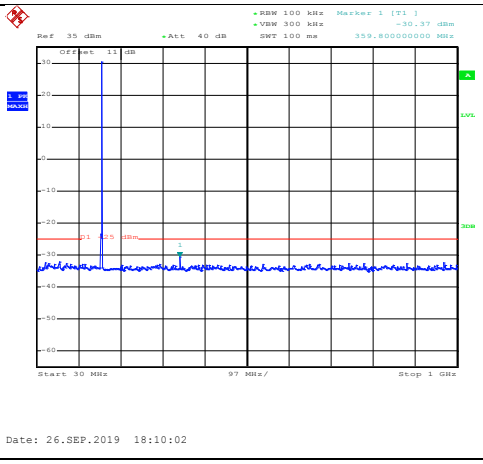
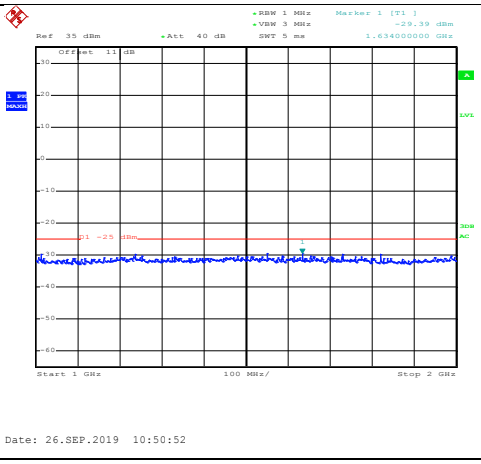
Channel Bandwidth = 6.25 kHz	Channel Bandwidth = 12.5 kHz
	
Lowest channel	Lowest channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

6.5 Out of band emission at antenna terminals

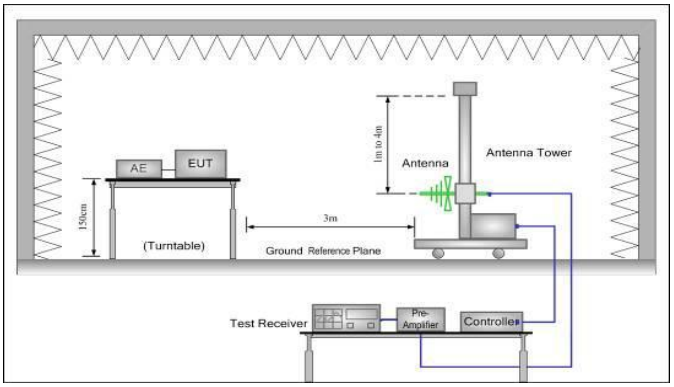
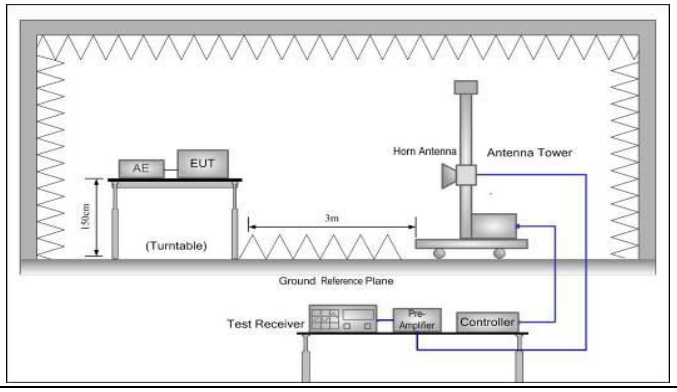
Test Requirement:	FCC part 2.1051,Part 90.210
Test Method:	ANSI/TIA-603-D 2010
Limit:	Channel Bandwidth = 6.25 kHz and 12.5KHz: -25dBm Channel Bandwidth = 25 kHz:-13dBm
Test setup:	
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plots as follows:

Channel Bandwidth = 6.25 kHz	
Lowest Channel	
	
30MHz~1GHz	1GHz~3GHz
Middle channel	
	
30MHz~1GHz	1GHz~3GHz
Highest Channel	
	
30MHz~1GHz	1GHz~3GHz

Channel Bandwidth = 12.5 kHz	
Lowest Channel	
	
30MHz~1GHz	1GHz~3GHz
Middle channel	
	
30MHz~1GHz	1GHz~3GHz
Highest Channel	
	
30MHz~1GHz	1GHz~3GHz

6.6 Field strength of spurious radiation measurement

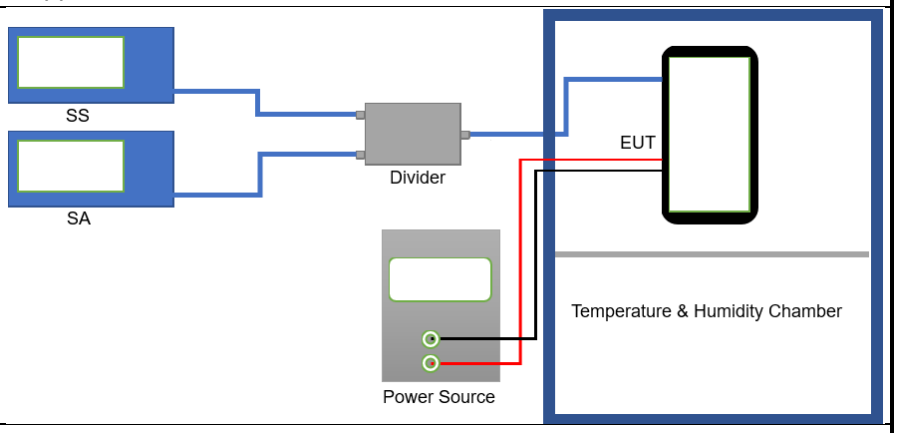
Test Requirement:	FCC part 2.1051,Part 90.210
Test Method:	ANSI/TIA-603-D 2010
Limit:	Channel Bandwidth = 6.25 kHz and 12.5KHz: -25dBm Channel Bandwidth = 25 kHz:-13dBm
Test setup:	Below 1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data (worst case):

Channel Bandwidth = 6.25 kHz				
Lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
300.01	Vertical	-51.45	-25.00	Pass
450.01	V	-58.01		
600.01	V	-43.29		
300.01	Horizontal	-48.88	-25.00	Pass
450.01	H	-57.87		
600.01	H	-42.43		
Middle channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
324.00	Vertical	-53.45	-25.00	Pass
486.00	V	-55.10		
648.00	V	-42.55		
324.00	Horizontal	-47.98	-25.00	Pass
486.00	H	-57.34		
648.00	H	-42.12		
Highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
347.99	Vertical	-60.08	-25.00	Pass
521.99	V	-55.15		
695.99	V	-48.63		
347.99	Horizontal	-57.82	-25.00	Pass
521.99	H	-56.22		
695.99	H	-47.55		
Remark: *1. The emission levels of above 1 GHz are very lower than the limit and not show in test report.*				

Channel Bandwidth = 12.5 kHz				
Lowest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
300.01	Vertical	-51.37	-25.00	Pass
450.02	V	-57.86		
600.03	V	-43.35		
300.01	Horizontal	-48.27	-25.00	Pass
450.02	H	-57.36		
600.03	H	-42.83		
Middle channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
324.00	Vertical	-53.64	-25.00	Pass
486.00	V	-55.61		
648.00	V	-42.87		
324.00	Horizontal	-47.95	-25.00	Pass
486.00	H	-57.86		
648.00	H	-42.37		
Highest channel				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
347.99	Vertical	-60.24	-25.00	Pass
521.98	V	-55.73		
695.98	V	-48.96		
347.99	Horizontal	-57.43	-25.00	Pass
521.98	H	-56.38		
695.98	H	-47.86		
Remark: *1. The emission levels of above 1 GHz are very lower than the limit and not show in test report.*				

6.7 Frequency stability

Test Requirement:	FCC Part 90.213, FCC Part 2.1055
Test Method:	ANSI/TIA-6-3-D 2010
Limit:	±1 ppm
Test setup:	
Test procedure:	**For V.S. temperature measurement:** 1. The equipment under test was connected to an external power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached. **For V.S. voltage measurement:** 1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

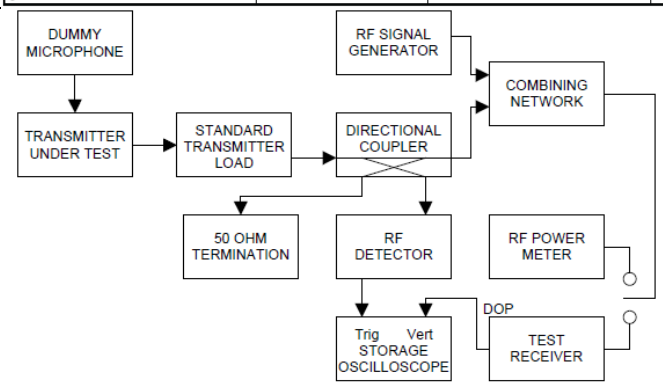
a) For V.S. temperature measurement Data (the worst channel):

Reference Frequency =162MHz(Middle channel)					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12	-30	83	0.512346	±1	Pass
	-20	64	0.395062		
	-10	52	0.320988		
	0	0	0.000000		
	10	62	0.382716		
	20	76	0.469136		
	30	85	0.524691		
	40	92	0.567901		
	50	144	0.888889		

b) For V.S. temperature measurement Data (the worst channel):

Reference Frequency =162MHz(Middle channel)					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	10.2	62	0.382716	±1	Pass
	12.0	34	0.209877		
	27.6	58	0.358025		

6.8 Transient frequency behavior

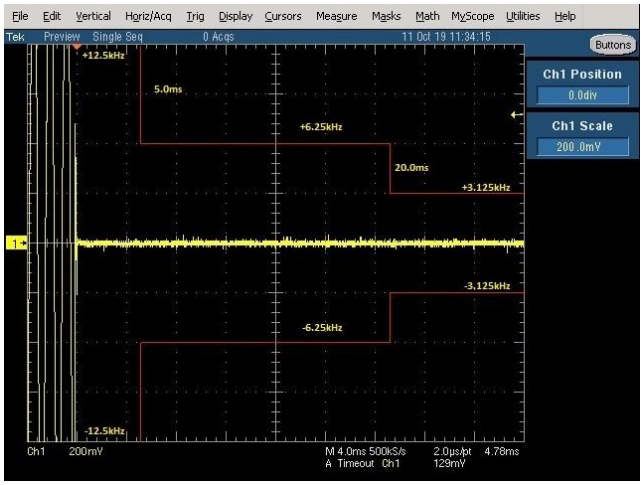
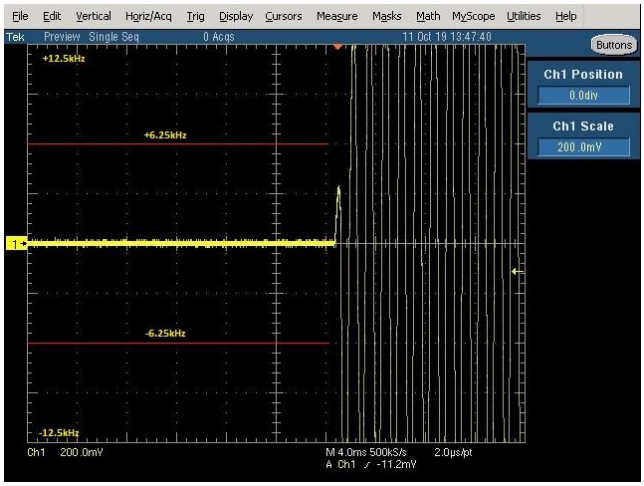
Test Requirement:	FCC Part 90.214
Test Method:	ANSI/TIA-6-3-D 2010
Limit:	Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels t_1[4] ±12.5 kHz 5.0 ms 10.0 ms t_2 ±6.25 kHz 20.0 ms 25.0 ms t_3[4] ±12.5 kHz 5.0 ms 10.0 ms Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels t_1[4] ±6.25 kHz 5.0 ms 10.0 ms t_2 ±3.125 kHz 20.0 ms 25.0 ms t_3[4] ±6.25 kHz 5.0 ms 10.0 ms
Test setup:	
Test procedure:	a) Connect the equipment as illustrated. b) Connect the test receiver Demodulator Output Port (DOP) to the vertical input channel of the storage oscilloscope. Connect the output of the RF peak detector to the external trigger on the storage oscilloscope. Connect the output of the RF combiner to the RF power meter. c) Set the test receiver to measure FM deviation with the audio bandwidth set at ≤50 Hz to ≥15,000 Hz, and tune the RF frequency to the transmitter assigned frequency. d) Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at ±25 kHz deviation and set its output level to -100dBm. e) Key the transmitter. f) Supply sufficient attenuation via the RF attenuator to provide an input level to the test receiver that is 40 dB below the test receiver maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the RF power meter. g) Unkey the transmitter. h) Adjust the RF level of the signal generator to provide RF power into the RF power meter equal to the level noted in step f). This signal generator RF level shall be maintained throughout the rest of the measurement. i) Disconnect the RF power meter and connect the output of the RF combiner network to the input of the test receiver. j) Set the horizontal sweep rate on the storage oscilloscope to 10 milliseconds per division and adjust the display to continuously view the 1000 Hz tone from the DOP. Adjust the vertical amplitude control of the oscilloscope to display the 1000 Hz at ±4 divisions vertically centered on the display. k) Adjust the oscilloscope so it will trigger on an increasing magnitude from the RF peak detector at 1 division from the left side of the display, when the transmitter is turned on. Set the controls to store the display. l) Reduce the attenuation of the RF attenuator so the input to the RF peak detector and the RF combiner is increased by 30 dB when the transmitter is turned on. m) Key the transmitter and observe the stored display. The output at the DOP, due to the change in the ratio of power between the signal generator input power and the transmitter output power will, because of the capture effect of the test receiver, produce a change in display: For

	the first part of the sweep it will show the 1 kHz test signal. Then once the receiver's demodulator has been captured by the transmitter power, the display will show the frequency difference from the assigned frequency to the actual transmitter frequency versus time. The instant when the 1 kHz test signal is completely suppressed (including any capture time due to phasing) is considered to be ton . The trace should be maintained within the allowed divisions during the period t1 and t2. See the figure in the appropriate standards section. n) During the time from the end of t2 to the beginning of t3 the frequency difference should not exceed the limits set by the FCC in 47 CFR 90.214 and outlined in 3.2.2. The allowed limit is equal to the transmitter frequency times its FCC frequency tolerance times ±4 display divisions divided by 25 kHz. For example, at a transmitter assigned frequency of 500MHz and a frequency tolerance of 5 ppm. This would be 500 MHz times 5ppm times ±4 divisions divided by 25 kHz. This equals ±0.4 divisions in this example. Greater vertical sensitivity may be required to view this accurately. o) Key the transmitter and observe the stored display. The trace should be maintained within the allowed divisions after the end of t2 and remain within it until the end of the trace. See the figure in the appropriate standards sections. p) To test the transient frequency behavior during the period t3 the transmitter shall be keyed. q) Adjust the oscilloscope trigger controls so it will trigger on a decreasing magnitude from the RF peak detector, at 1 division from the right side of the display, when the transmitter is turned off. Set the controls to store the display. The moment when the 1 kHz test signal starts to rise is considered to provide toff . r) The transmitter shall be unkeyed. s) Observe the display. The trace should remain within the allowed divisions during period t3. See the figures in the appropriate standards section.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

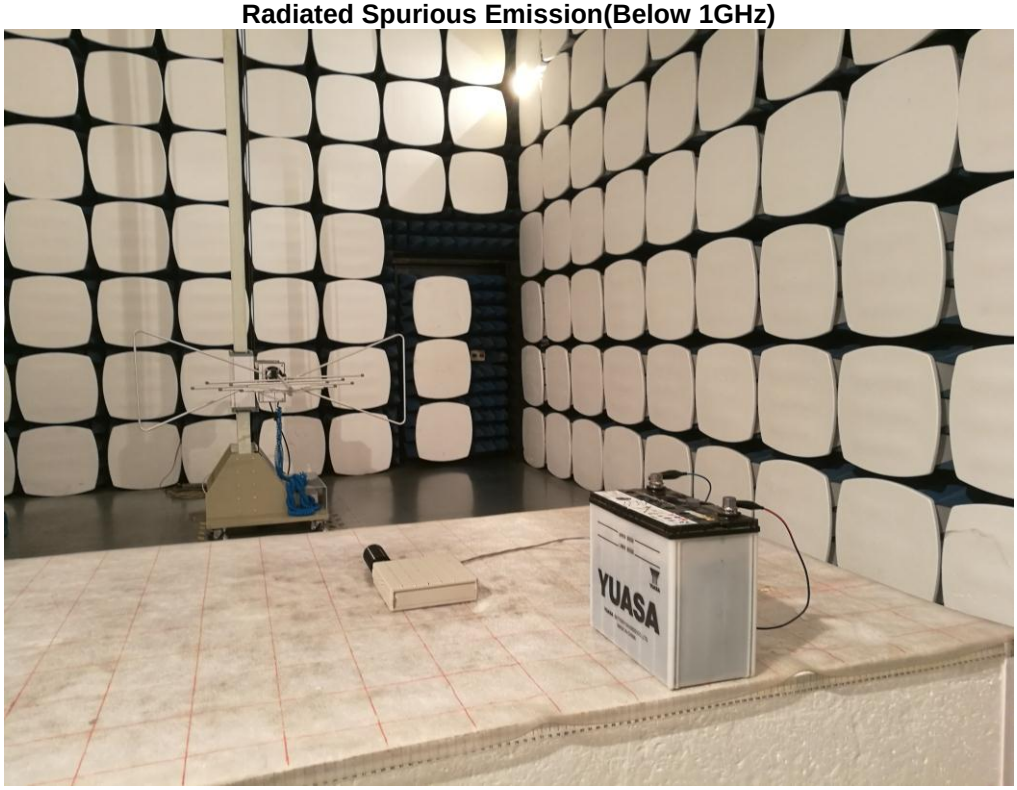
Reference Frequency =162MHz (Middle channel)

Channel spacing: 6.25kHz (worst case)

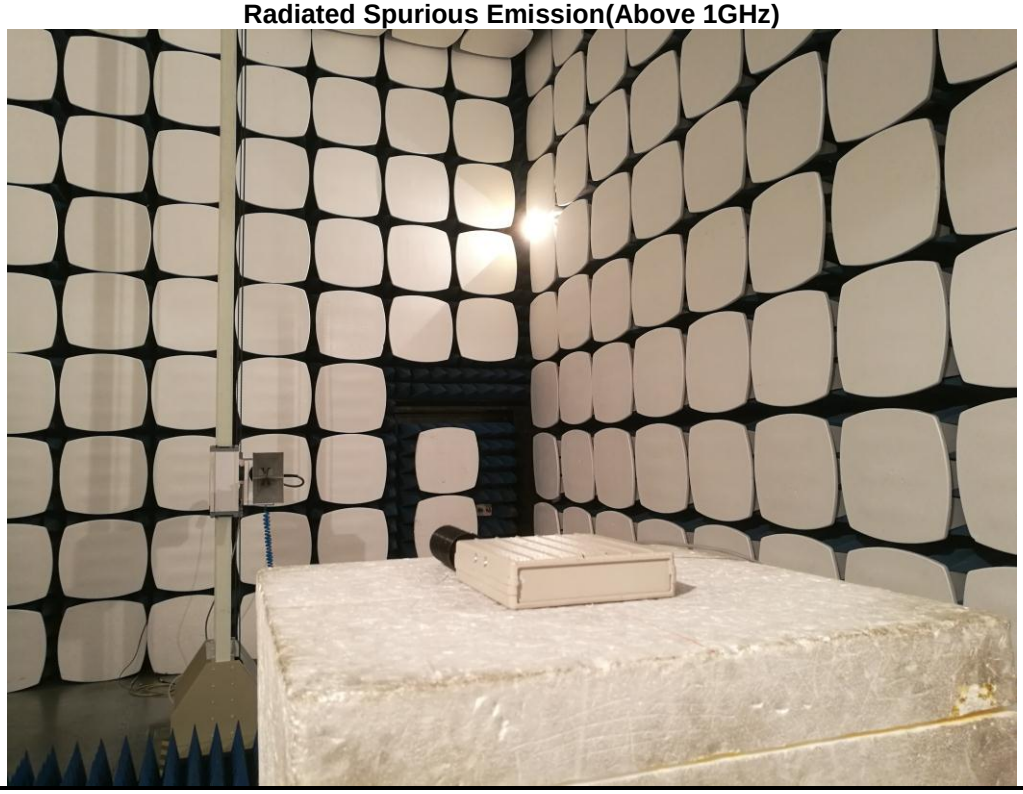
Switch on	Switch off
	

7 Test Setup Photo

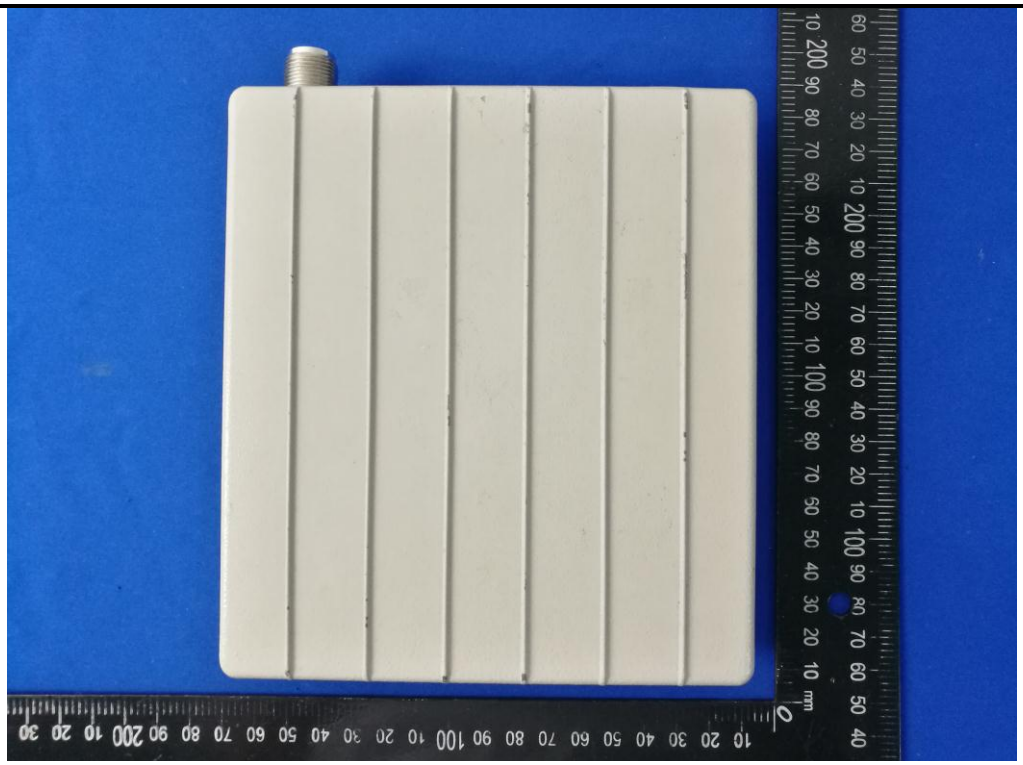
Radiated Spurious Emission(Below 1GHz)

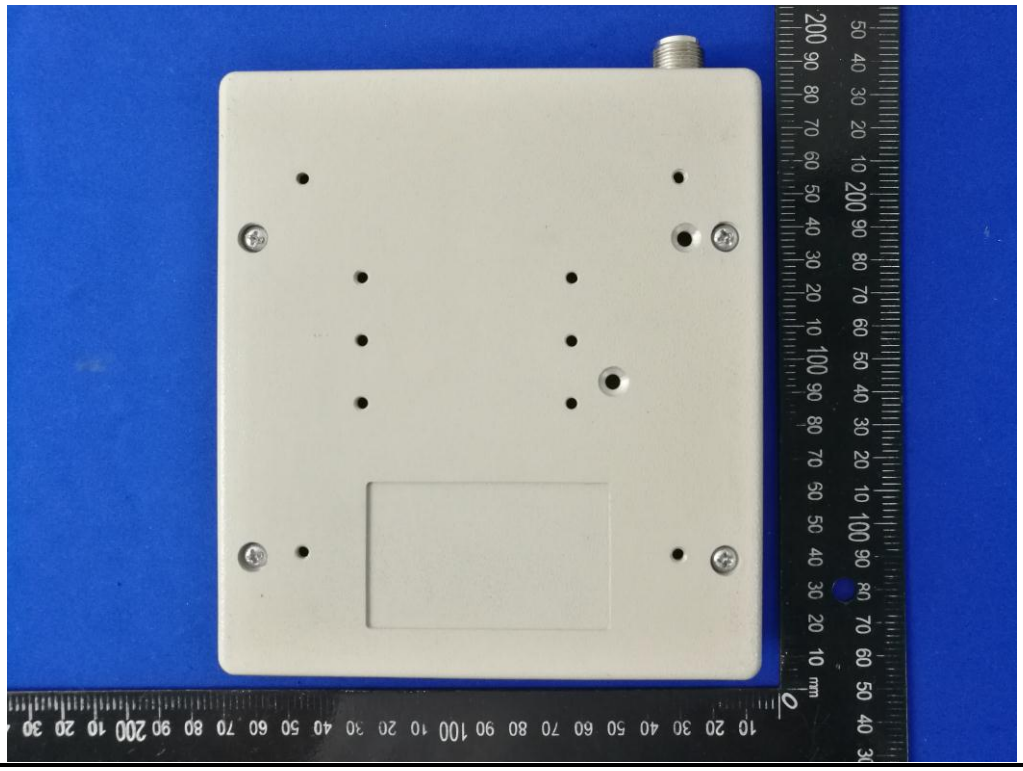


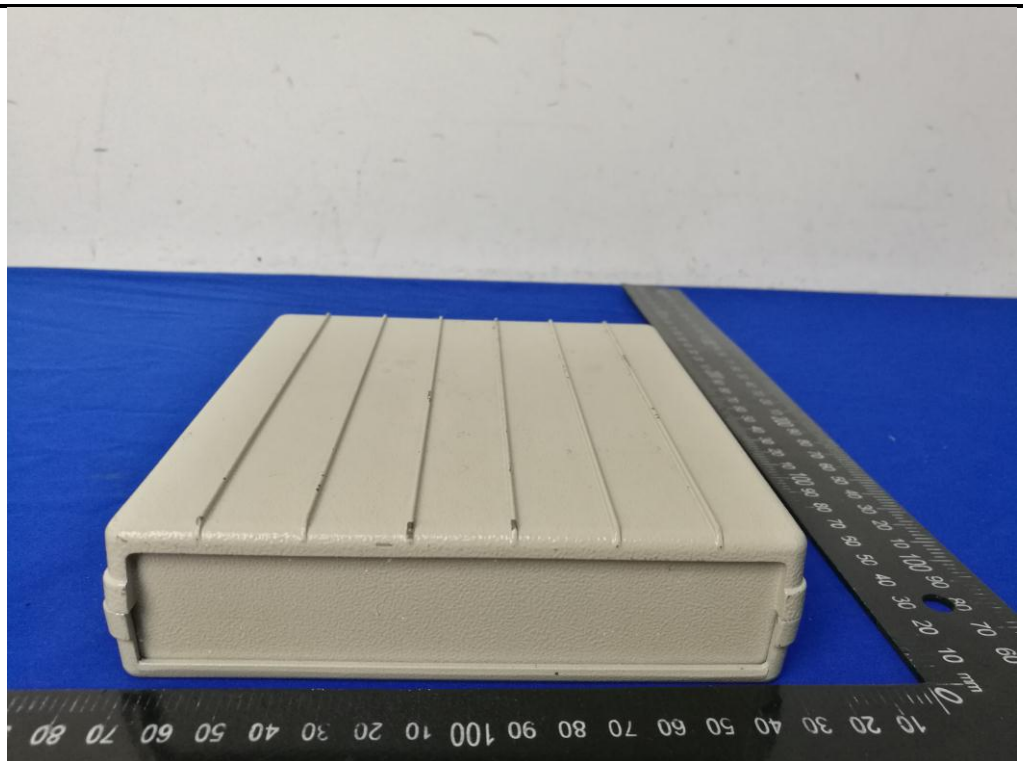
Radiated Spurious Emission(Above 1GHz)

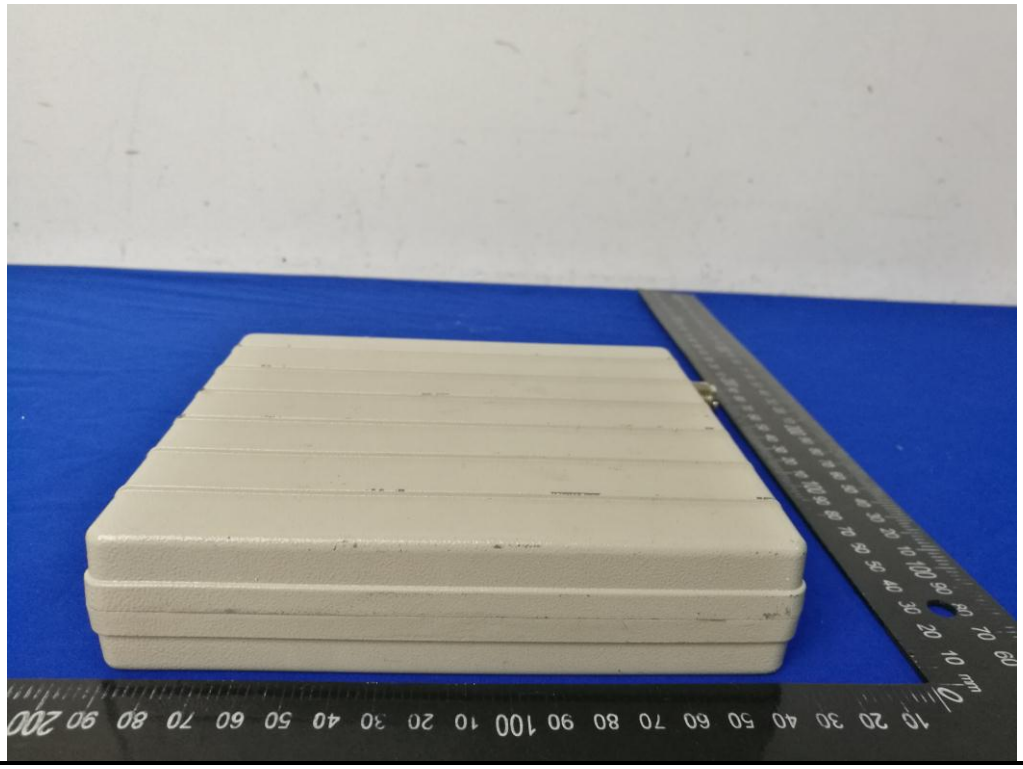


8 EUT Constructional Details

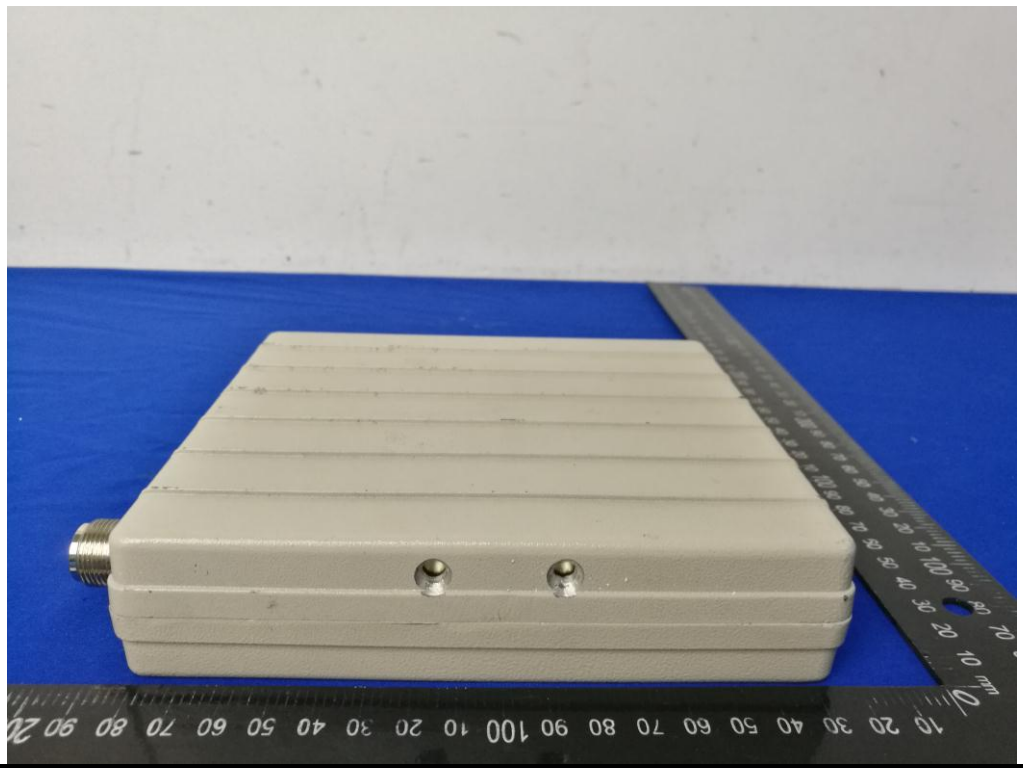




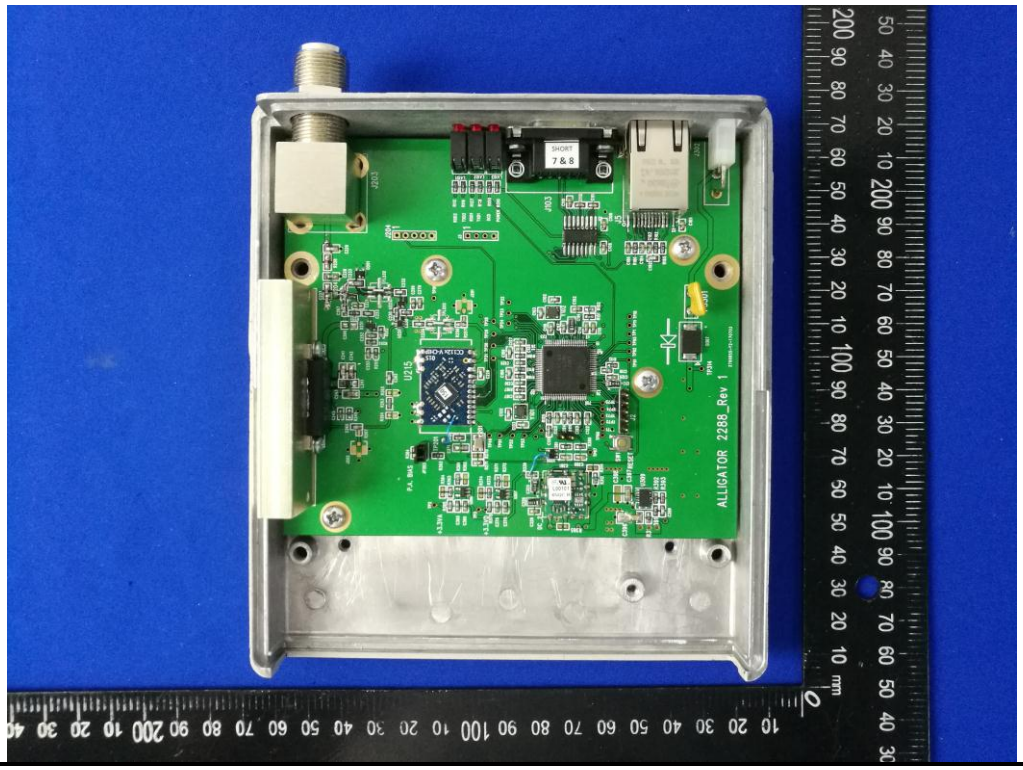


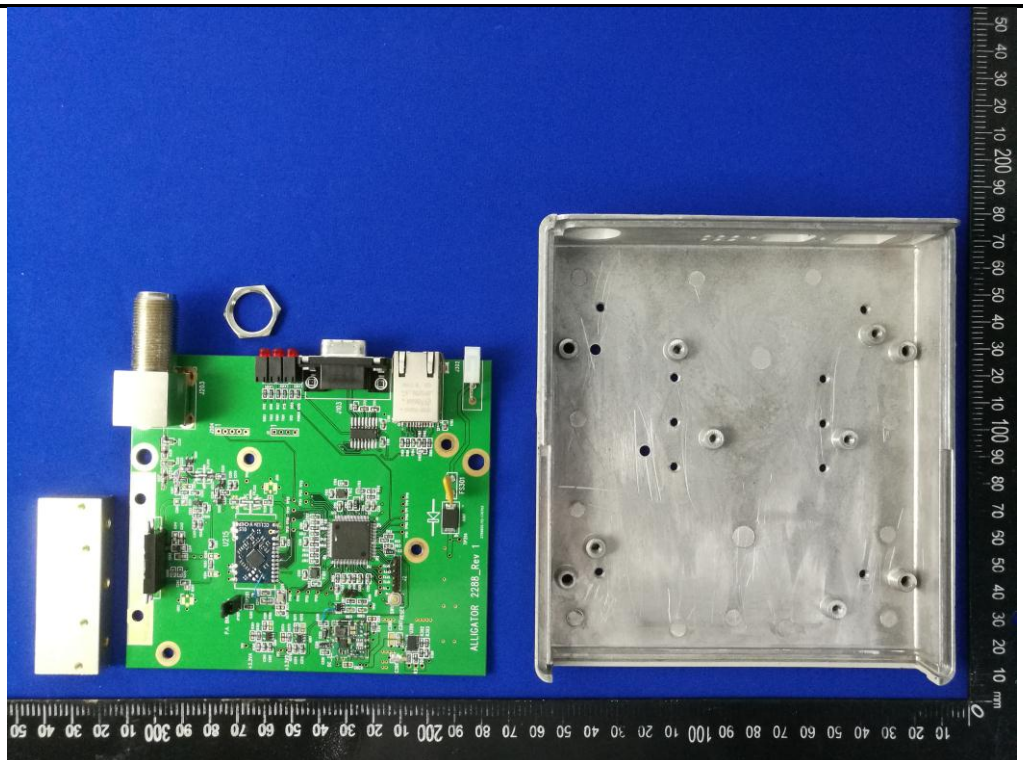



ANT Port
PWR IN
ETHERNET
RS232
PWR RX1 RX2
DCD TX1 TX2




ALLIGATOR 2288_Rev 1


ALLIGATOR 2288_Rev 1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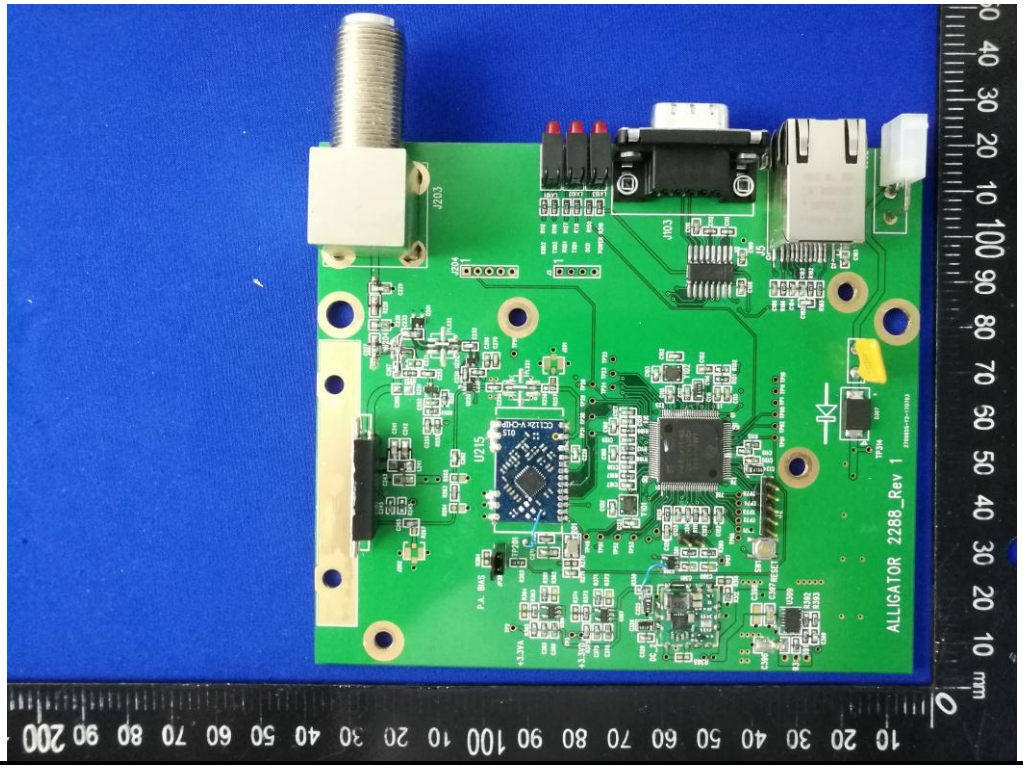
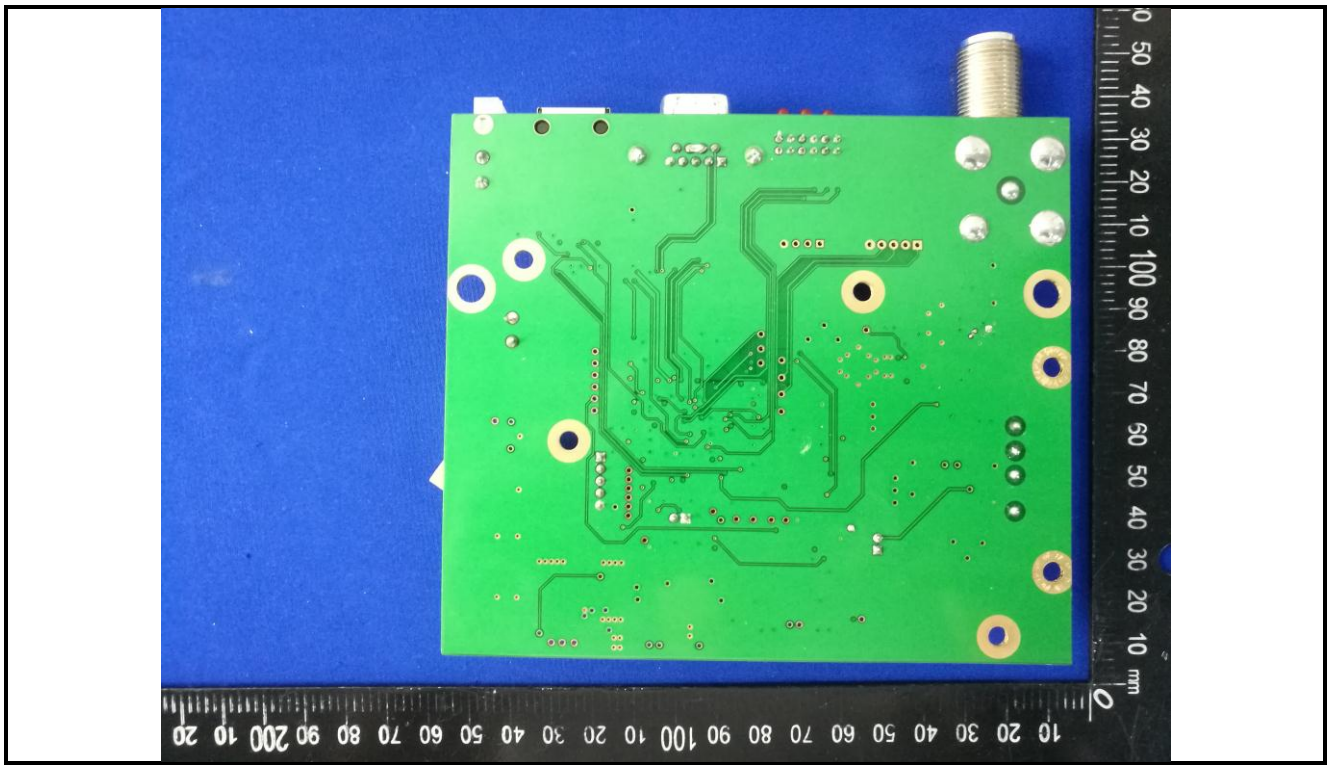

J203
J204
J303
U215
ALLIGATOR 2288_Rev 1



------End of report------