



FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

**Remote Control
MODEL NUMBER: CCA-1526T**

FCC ID: 2AJVNCCA-1526T

REPORT NUMBER: 4787568169 - 1

ISSUE DATE: October 11, 2016

Prepared for

**REECON M & E CO., LTD
No.10 ZHONGCUI ROAD, JIANGNING ECONOMIC DEVELOPMENT DISTRICT,
NANJING, JIANGSU**

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/11/2016	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	Radiated Spurious Emission	FCC 15.231(b) FCC 15.209 FCC 15.205	Complied
2	Occupied Bandwidth	FCC 15.231(c)	Complied
3	Transmitter Timeout	FCC 15.231(a)	Complied
4	Conducted Emission Test For AC Power Port	FCC 15.207	N/A
5	Antenna Requirement	FCC 15.203	Complied

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: REECON M & E CO., LTD
Address: No.10 ZHONGCUI ROAD, JIANGNING ECONOMIC DEVELOPMENT DISTRICT, NANJING, JIANGSU

Manufacturer Information

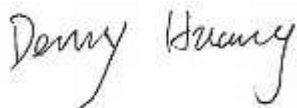
Company Name: REECON M & E CO., LTD
Address: No.10 ZHONGCUI ROAD, JIANGNING ECONOMIC DEVELOPMENT DISTRICT, NANJING, JIANGSU

EUT Description

Product Name Remote Control
Brand Name N/A
Model Name CCA-1526T
FCC ID 2AJVNCCA-1526T
Date Tested September 26, 2016 ~ September 28, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS

Tested By:




Denny Huang
Engineer Project Associate
Approved By:



Stephen Guo
Laboratory Manager

Check By:



Shawn Wen
Laboratory Leader

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013

3. FACILITIES AND ACCREDITATION

Test Location	Dongguan Dongdian Testing Service Co., Ltd
Address	No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Dongguan City, Guangdong Province, 523808, China
Accreditation Certificate	<p>Dongguan Dongdian Testing Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until January 31, 2018.</p> <p>Dongguan Dongdian Testing Service Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 270092, Renewal date March 11, 2015, valid time is until March 11, 2018.</p> <p>The 3m Alternate Test Site of Dongguan Dongdian Testing Service Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 10288A on April 23, 2015, valid time is until April 23, 2018.</p>

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Uncertainty for Conduction emission test	3.32dB (150KHz-30MHz)
	3.72dB (9KHz-150KHz)
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.70 dB (Antenna Polarize: V)
	4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1GHz to 18GHz)(include Fundamental emission)	4.10dB(1-6GHz)
	4.40dB (6GHz-18Gz)
Bandwidth	1.1%
Stop Transmitting Time Test	0.6%
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Equipment	Remote Control	
Model Name	CCA-1526T	
Product Description	Operation Frequency	433.92MHz
	Channel	1CH
	Modulation Type	
	ASK	
Power Supply	DC 3V by battery	
Type of Transmitter	<input checked="" type="checkbox"/> Manually operated transmitter	
	<input checked="" type="checkbox"/> Transmitter activated automatically	
	<input type="checkbox"/> Periodic transmissions	

Note: The EUT will transmit when the following two conditions occurred:

- Transmit automatically when the NTC temperature changed.
- Transmit manually when pressing K5(ON-OFF Button) or K6(Launching Button) or K7(Up Button) or K8(Down Button).

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	433.92	PCB Antenna	2.7

Modulation	Transmit and Receie Mode	Description
ASK	<input checked="" type="checkbox"/> 1TX, 1RX	Chain 1 can be used as transmitting

5.3. DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX
For Radiated Emission	
Final Test Mode	Description
Mode 1	TX

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	N/A	N/A	N/A	N/A

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	N/A	N/A	N/A	N/A	N/A

ACCESSORY

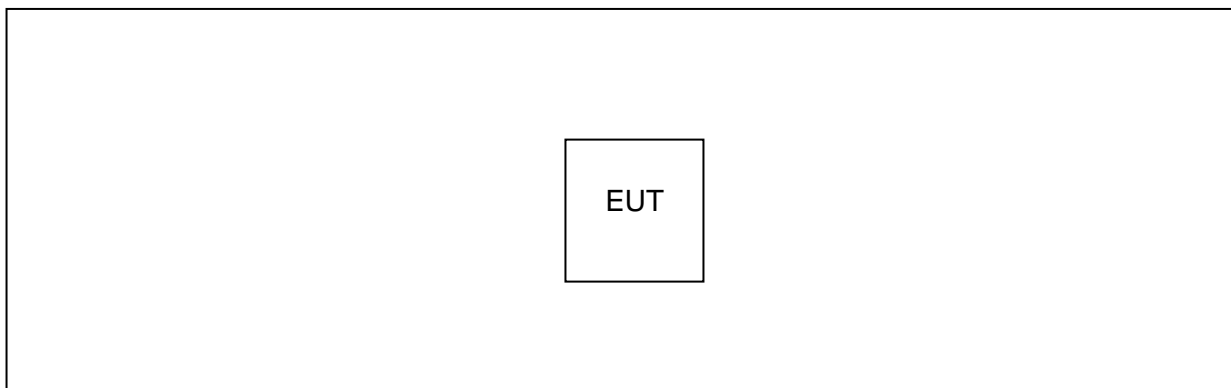
Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A		N/A

Note: The EUT has no accessory.

TEST SETUP

The EUT can work in an engineer mode for continue transmitting.

SETUP DIAGRAM FOR TESTS



5.5. MEASURING INSTRUMENT AND SOFTWARE USED

Instrument (Conducted for RF Port)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
<input checked="" type="checkbox"/>	Spectrum Analyzer	R&S	FSU26	1166.1660.26	2015/10/24	2016/10/23
Instrument (Radiated Tests)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Expired date
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESU8	100316	2015/10/24	2016/10/23
<input checked="" type="checkbox"/>	Spectrum analyzer	R&S	FSU26	1166.1660.26	2015/10/24	2016/10/23
<input checked="" type="checkbox"/>	Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2016/05/30	2017/05/29
<input checked="" type="checkbox"/>	Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	2015/10/24	2016/10/23
<input checked="" type="checkbox"/>	Double Ridged Horn Antenna	R&S	HF907	100276	2015/10/31	2016/10/30
<input checked="" type="checkbox"/>	Pre-amplifier	A.H.	PAM-0118	360	2016/08/18	2017/08/17
<input checked="" type="checkbox"/>	RF Cable	HUBSER	CP-X2	W11.03	2015/10/24	2016/10/23
<input checked="" type="checkbox"/>	RF Cable	HUBSER	CP-X1	W12.02	2015/10/24	2016/10/23
<input checked="" type="checkbox"/>	MI Cable	HUBSER	C10-01-01-1M	1091629	2015/10/24	2016/10/23
<input checked="" type="checkbox"/>	Test software	Audix	E3	V 6.11111b	N/A	N/A

6. ANTENNA PORT TEST RESULTS

6.1. BANDWIDTH TEST

LIMITS

FCC Part15, Subpart C (15.231)		
Section	Test Item	Limit
FCC 15.231 (c)	20dB Bandwidth	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency.

Note: For 433.92MHz devices, the limit = $433.92\text{MHz} \times 0.25\% = 1084.8\text{KHz}$

TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$\geq 1\%$ of the 20 dB bandwidth
VBW	$\geq \text{RBW}$
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP

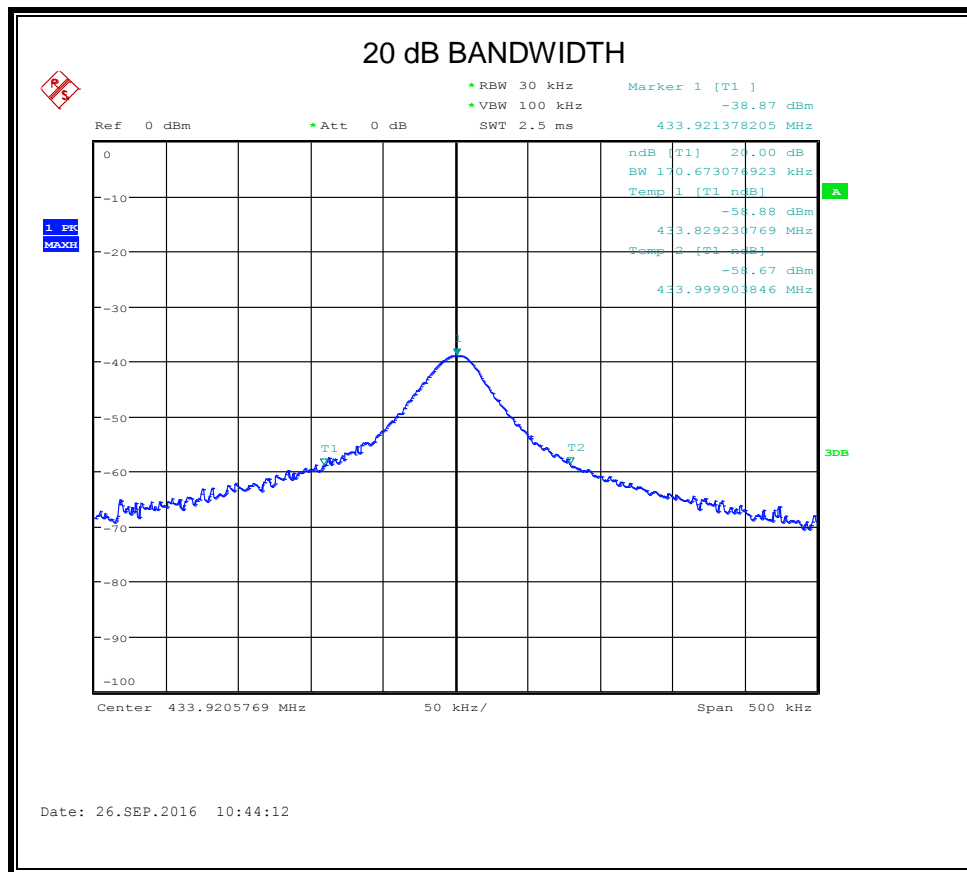


TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 40%
Test Voltage: DC 3V

RESULTS

Frequency (MHz)	20dB bandwidth (kHz)	Limit (kHz)	Result
433.92	170.673	1084.8	Pass



6.2. TRANSMITTER TIMEOUT

LIMITS

FCC Part15, Subpart C (15.231)		
Section	Type	Limit
FCC 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.
	2	A transmitter activated automatically shall cease transmission within 5 seconds after activation.
	3	Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour
	4	Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	1M
VBW	1M
Trace	Max hold
Sweep	5s

TEST SETUP



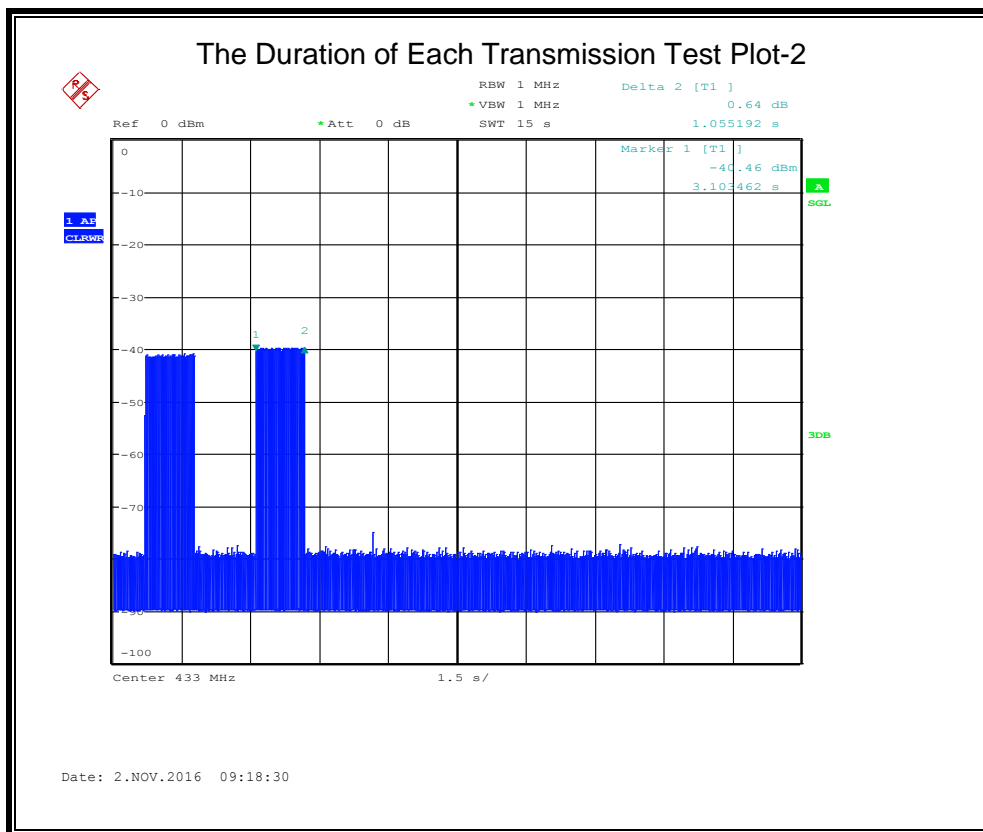
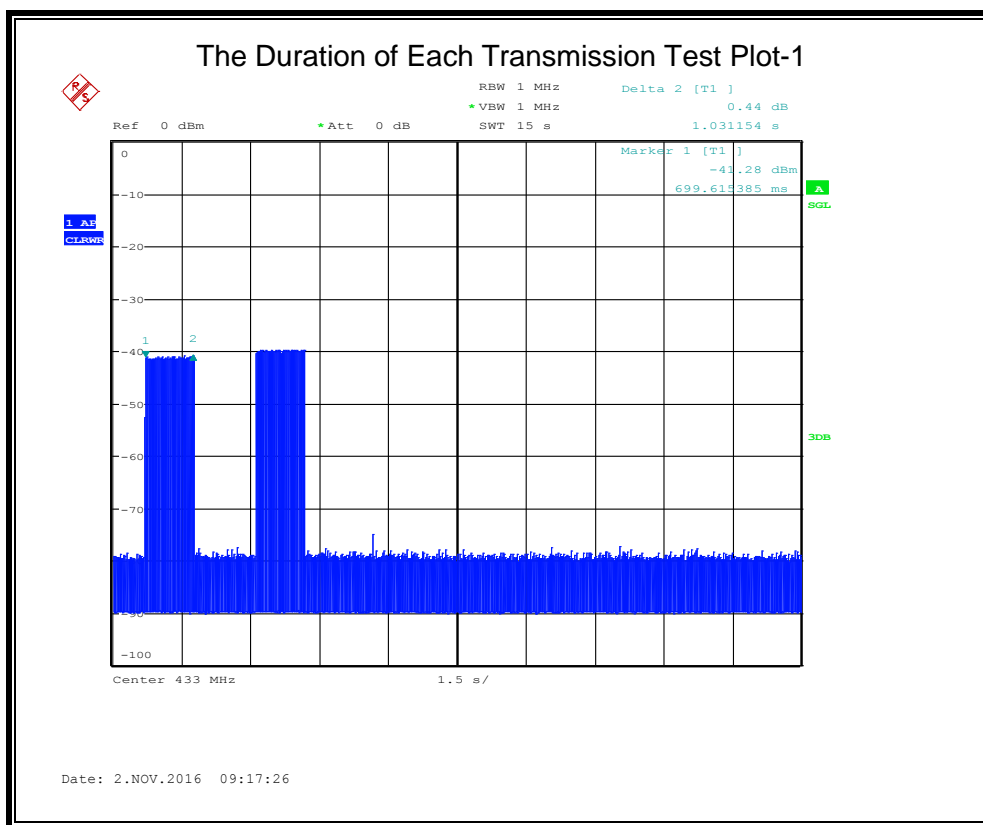
TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 40%
Test Voltage: DC 3V

RESULTS

The Duration of Each Transmission	Limit	Result
2.086s	<5s	PASS

- Note: 1. This measurement was done at the actual operation.
2. The EUT will transmit when the following two conditions occurred:
- a. Transmit automatically when the NTC temperature changed.
 - b. Transmit manually when pressing K5(ON-OFF Button) or K6(Launching Button) or K7(Up Button) or K8(Down Button).
1. For each type of transmit(automatically and manually), the transmit time and signal is the same, so only one data was reported.



7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.231, FCC §15.205 and §15.209

Radiation Disturbance Test Limit for FCC (Class B) (9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Radiation Disturbance Test Limit for FCC 15.231

Fundamental Frequency (MHz)	Field Strength of fundamental (microvolts/meter)	Field Strength of Unwanted Emissions (microvolts/meter)
40.66 - 40.70	2250.00	225.00
70 - 130	1250.00	125.00
130 - 174	1,250 to 3,750 **	125 to 375 **
174 - 260	3750.00	375.00
260 - 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12500.00	1250.00

Notes:

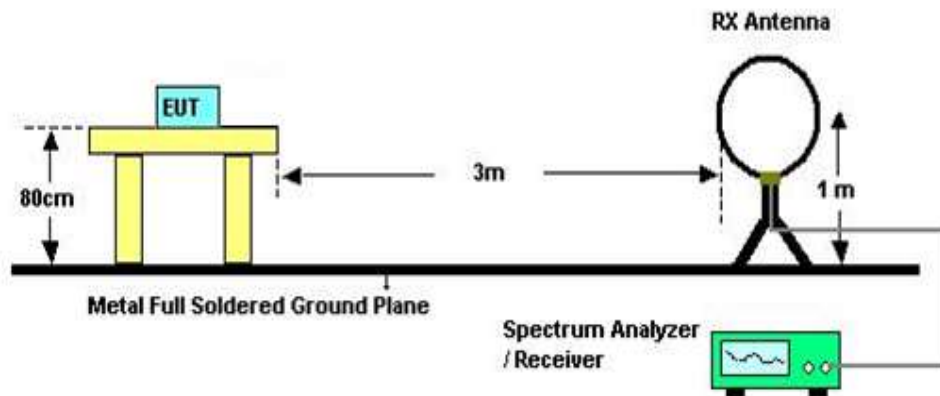
(1) ** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in 93 Section 15.209, whichever limit permits a higher field strength.

TEST SETUP AND PROCEDURE

Below 30MHz

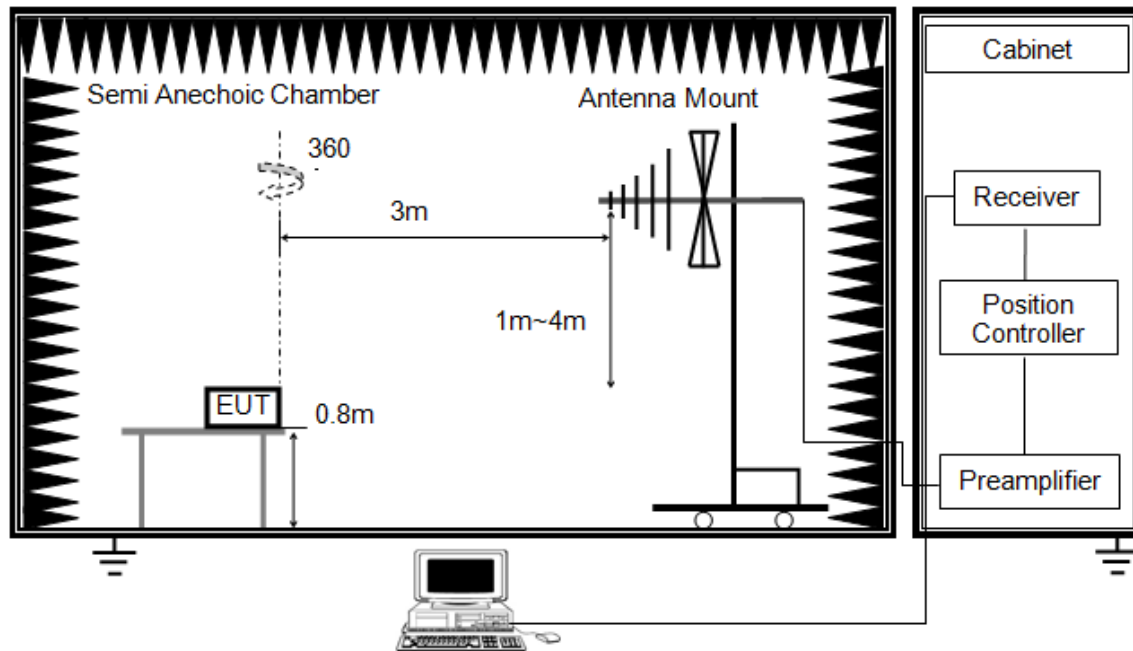


The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. EUT in each of three orthogonal axis emissions had been tested, but only the worst case (Z axis) data recorded in the report.

Below 1G

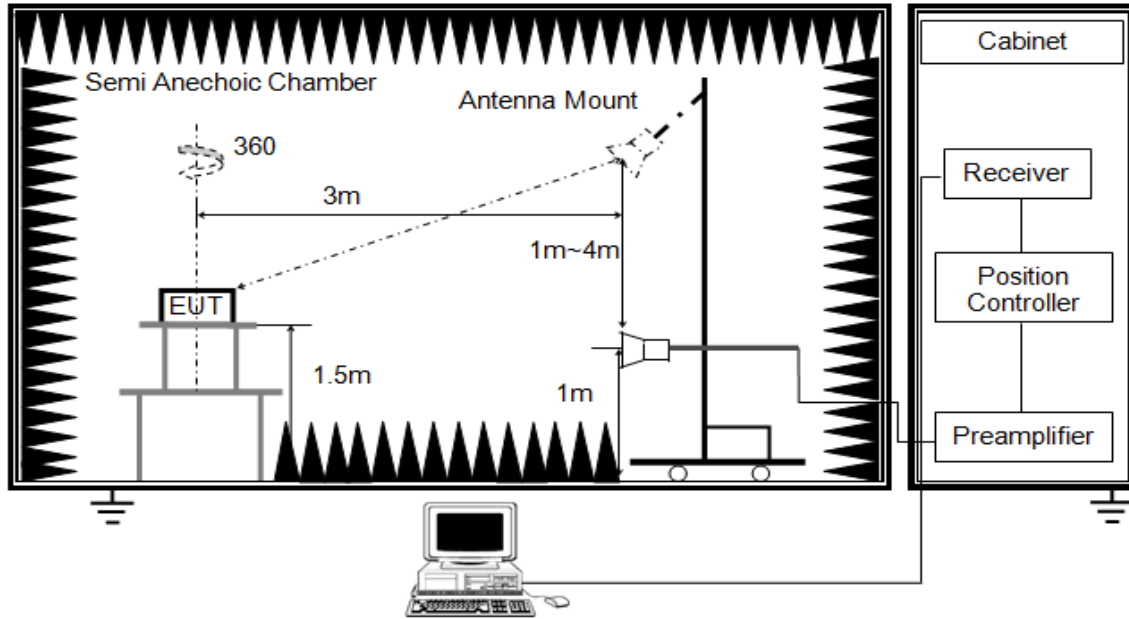


The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamplifier Factor = Level
6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. EUT in each of three orthogonal axis emissions had been tested, but only the worst case (Z axis) data recorded in the report.

ABOVE 1G



The setting of the spectrum analyser

RBW	1M
VBW	3M
Sweep	Auto
Detector	Peak and CISPR Average
Trace	Max hold

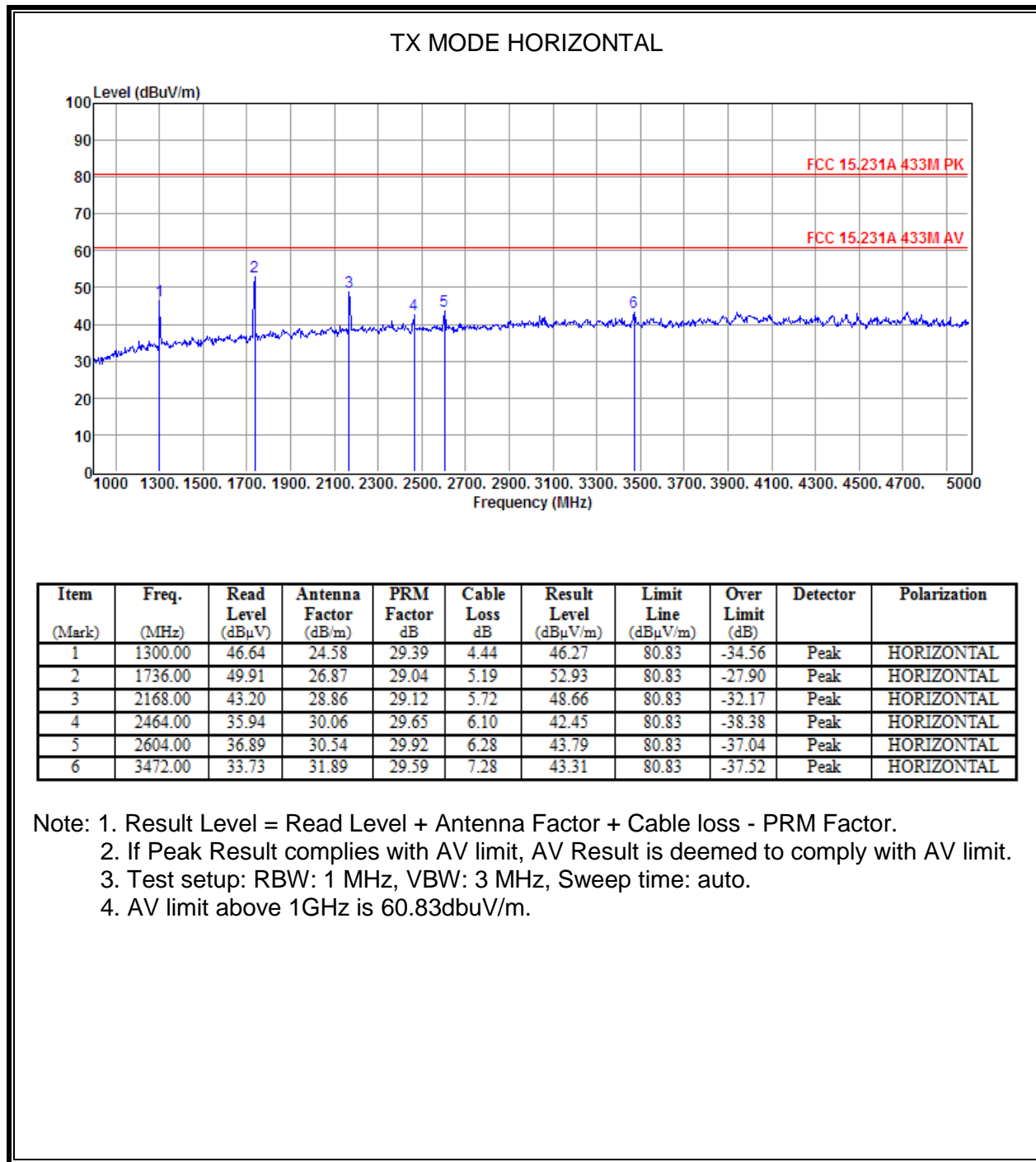
1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 1.5 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: $\text{Antenna Factor} + \text{Cable Loss} + \text{Read Level} - \text{Preamp Factor} = \text{Level}$
6. For measurement above 1GHz, the emission measurement will be measured by the peak detector and the AV detector.
7. EUT in each of three orthogonal axis emissions had been tested, but only the worst case (Z axis) data recorded in the report.

TEST CONDITIONS

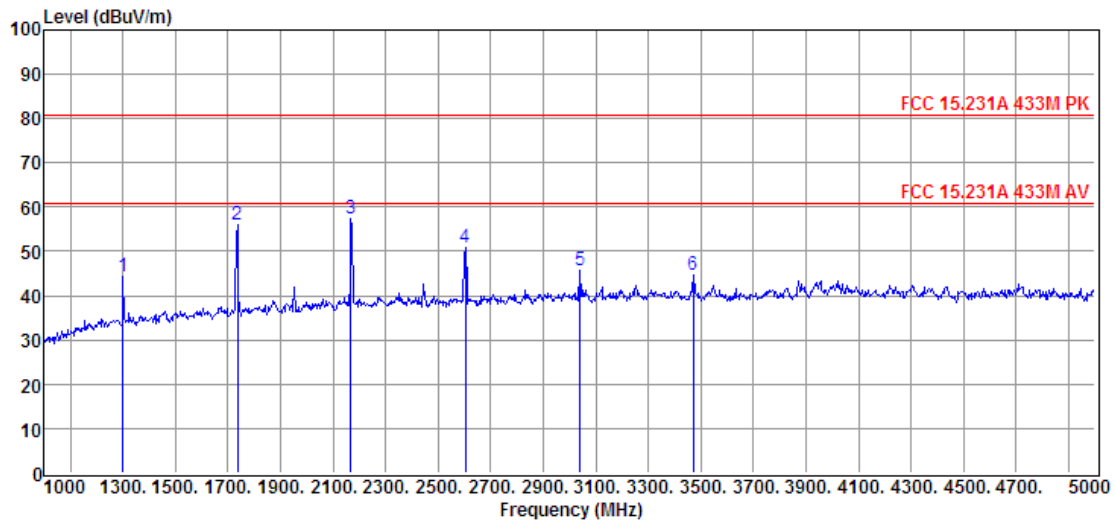
Temperature: 24.5°C
Relative Humidity: 55%
Test Voltage: DC 3V

7.2. SPURIOUS EMISSIONS (1~5GHz)

HARMONICS AND SPURIOUS EMISSIONS



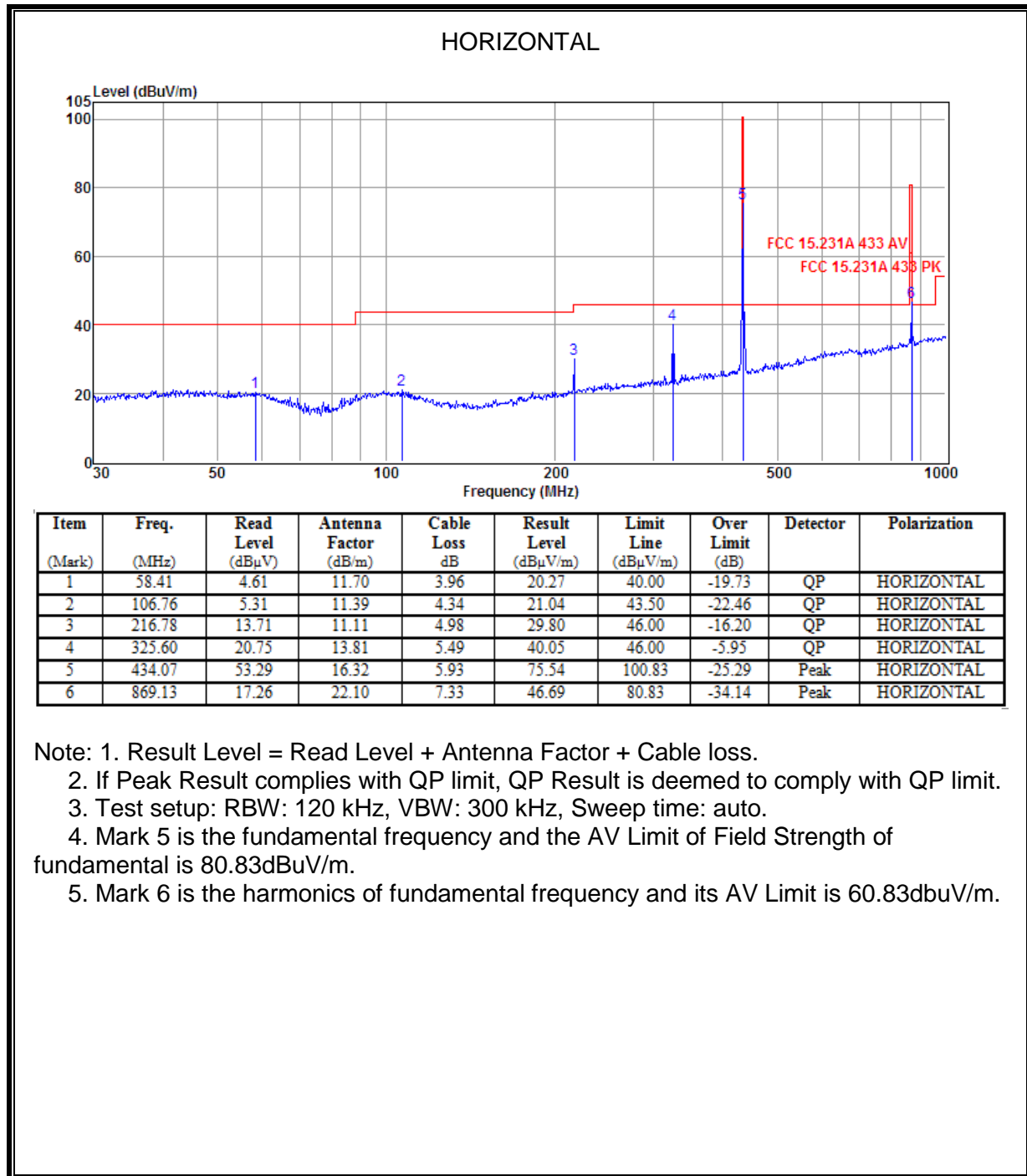
TX MODE VERTICAL



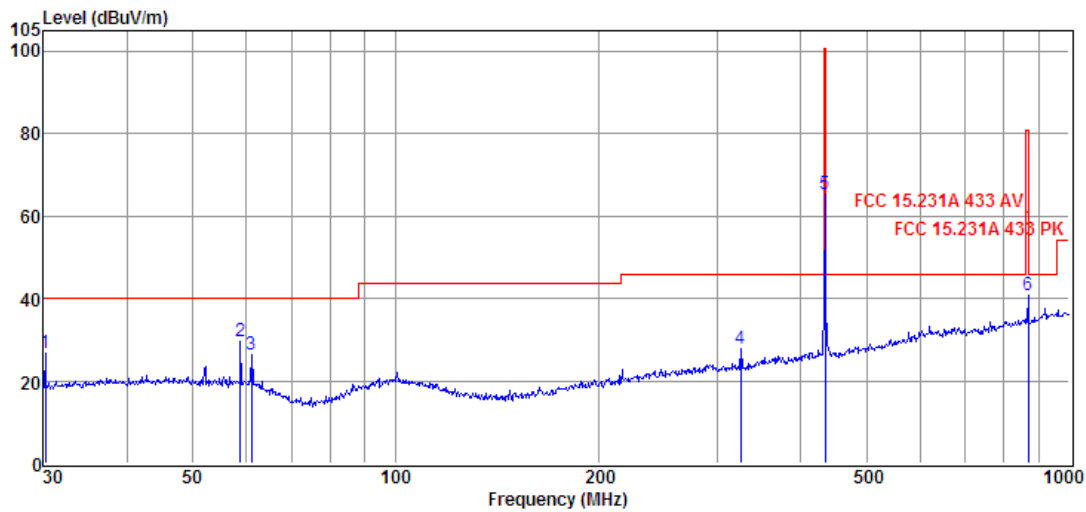
Item (Mark)	Freq. (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	PRM Factor dB	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	1300.00	44.77	24.58	29.39	4.44	44.40	80.83	-36.43	Peak	VERTICAL
2	1736.00	53.06	26.87	29.04	5.19	56.08	80.83	-24.75	Peak	VERTICAL
3	2168.00	51.86	28.86	29.12	5.72	57.32	80.83	-23.51	Peak	VERTICAL
4	2604.00	44.06	30.54	29.92	6.28	50.96	80.83	-29.87	Peak	VERTICAL
5	3040.00	37.33	31.72	30.17	6.83	45.71	80.83	-35.12	Peak	VERTICAL
6	3472.00	35.26	31.89	29.59	7.28	44.84	80.83	-35.99	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. AV limit above 1GHz is 60.83dbuV/m.

7.3. SPURIOUS EMISSIONS 30M ~ 1 GHz



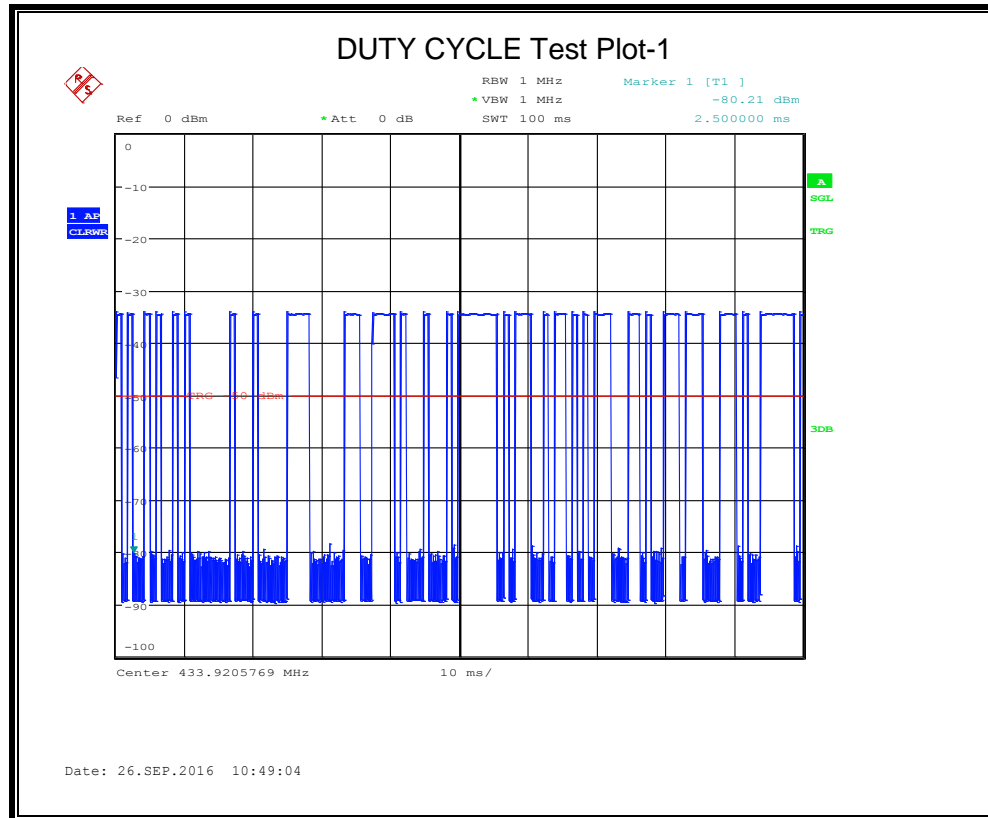
VERTICAL

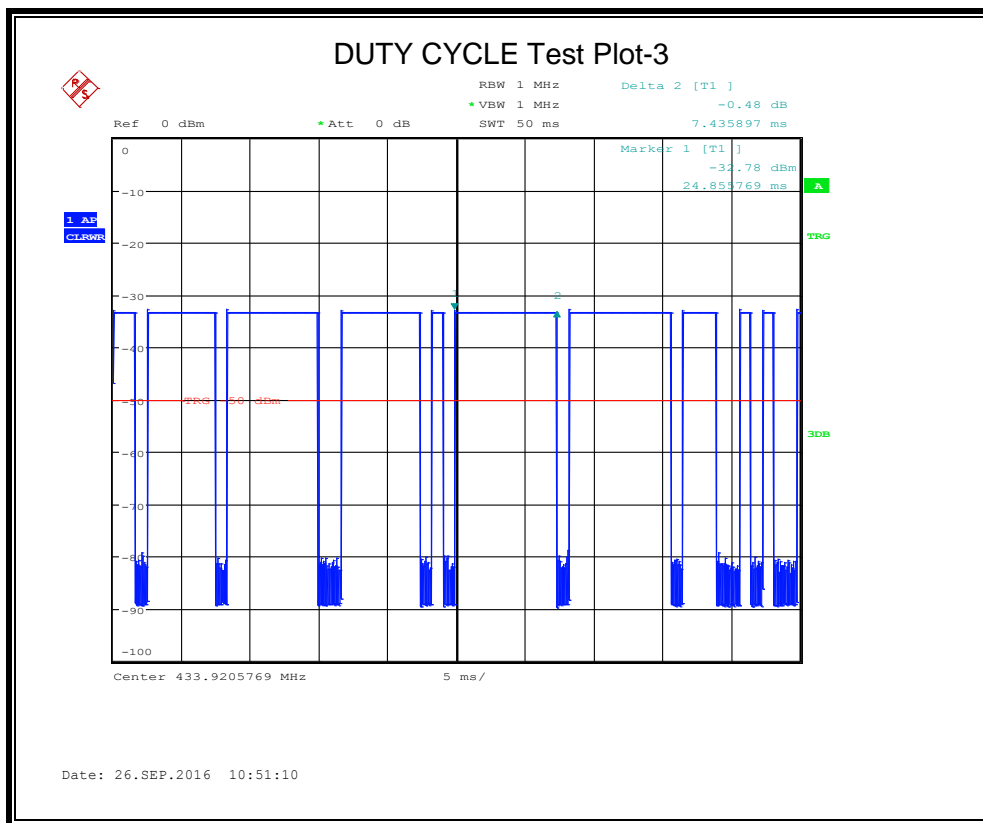
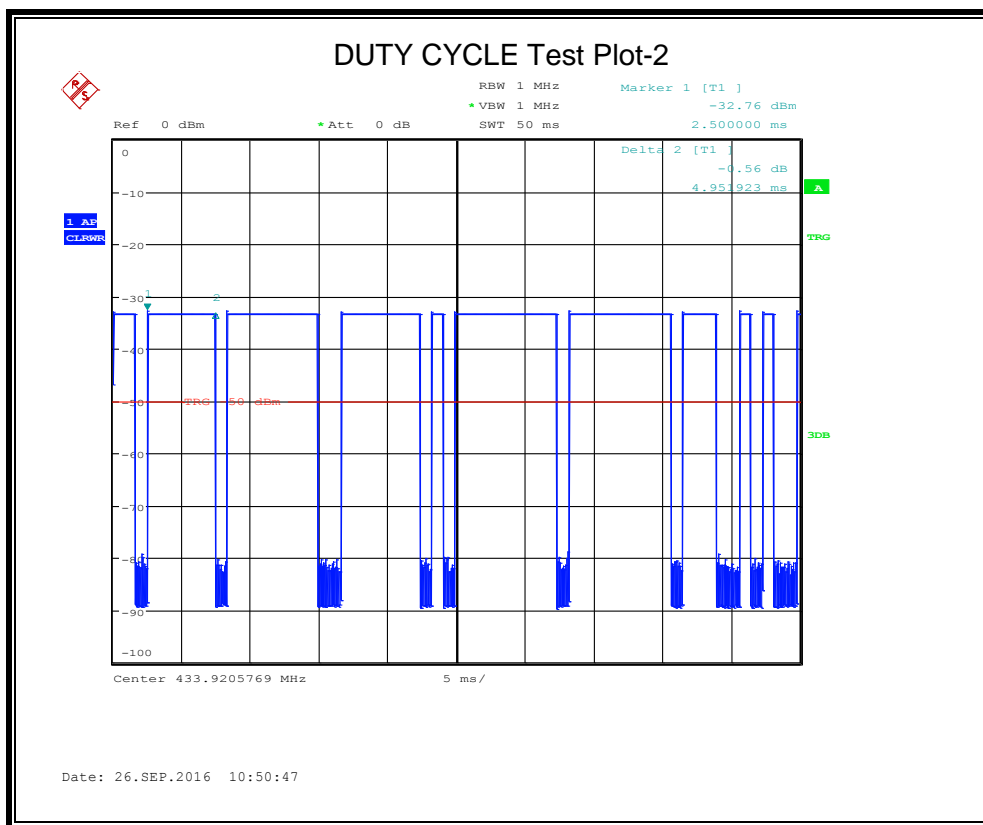


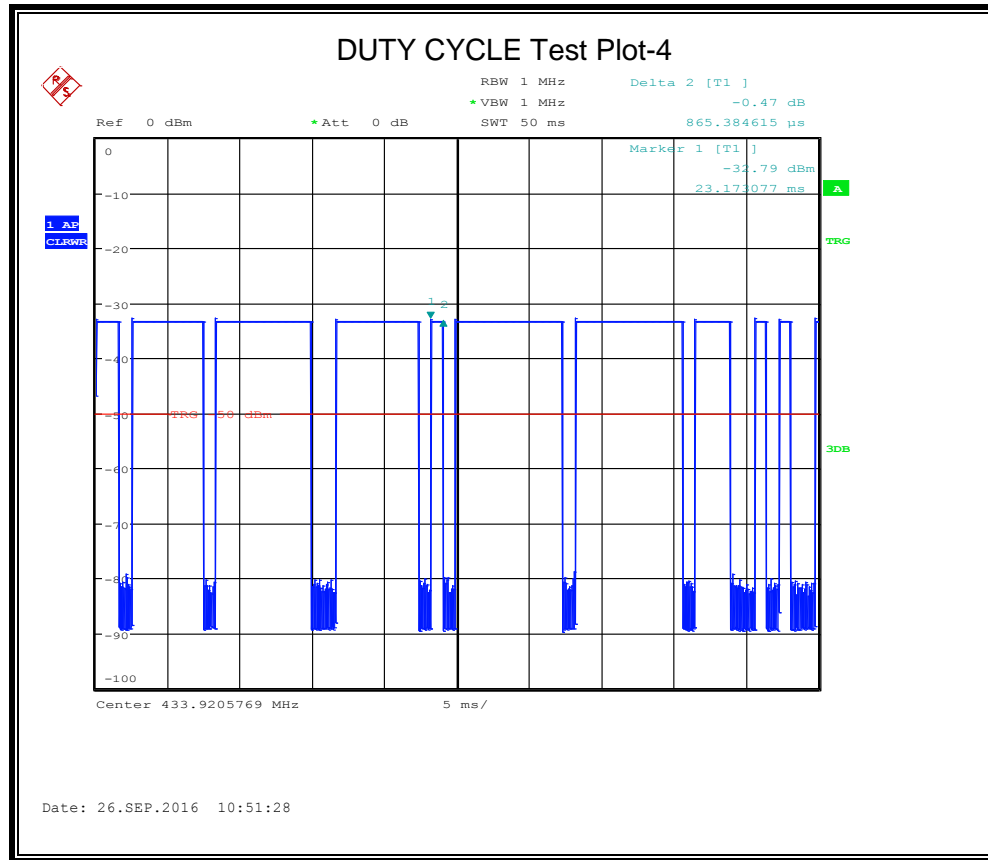
Item (Mark)	Freq. (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
1	30.21	11.86	11.13	3.67	26.66	40.00	-13.34	QP	VERTICAL
2	58.82	14.00	11.70	3.97	29.67	40.00	-10.33	QP	VERTICAL
3	61.13	11.15	11.19	3.99	26.33	40.00	-13.67	QP	VERTICAL
4	325.60	8.35	13.81	5.49	27.65	46.00	-18.35	QP	VERTICAL
5	434.07	43.05	16.32	5.93	65.30	100.83	-35.53	Peak	VERTICAL
6	869.13	11.47	22.10	7.33	40.90	80.83	-39.93	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.
4. Mark 5 is the fundamental frequency and the AV Limit of Field Strength of fundamental is 80.83dBuV/m.
5. Mark 6 is the harmonics of fundamental frequency and its AV Limit is 60.83dbuV/m.

The duty cycle is simply the on time divided by the period:
 The duration of one cycle = 100ms
 Effective period of the cycle = $4.95 \times 10 + 7.44 \times 2 + 0.865 \times 17 = 79.085\text{ms}$
 Duty Cycle = $79.085\text{ms} / 100\text{ms} = 0.79085 = 79.09\%$







7.4. SPURIOUS EMISSIONS BELOW 30M

Note 1: The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

8. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

For intentional device, according to 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.

EUT ANTENNA

The EUT antenna is permanent attached antenna. It complied with the standard requirement.

END OF REPORT

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