

Radio Test Report

FCC ID: 2A2V6-FZ**IC: 27624-FZ**

Report No. : TB-RF185807
Applicant : Flipper Devices Inc
Equipment Under Test (EUT)
EUT Name : Flipper Zero
Model No. : FZ.1
Series Model No. : ---
Brand Name : Flipper Zero
Sample ID : 20210916-08-1#& 20210916-08-2#
Receipt Date : 2021-12-05
Test Date : 2021-12-06 to 2021-12-31
Issue Date : 2021-12-31
Standards : FCC Part 15, Subpart C (15.231(a))
RSS-210 Issue 10 December 2019
RSS-Gen Issue 5 March 2019
Test Method : ANSI C63.10:2013
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer : 
Engineer Supervisor : 
Engineer Manager : 



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TB-RF185807	Rev.01	Initial issue of report	2021-12-31

1. General Information about EUT

1.1 Client Information

Applicant	:	Flipper Devices Inc
Address	:	2803 Philadelphia Pike, Suite B #551 Claymont, DE 19703, USA
Manufacturer	:	Flipper Devices Inc
Address	:	2803 Philadelphia Pike, Suite B #551 Claymont, DE 19703, USA

1.2 General Description of EUT (Equipment Under Test)

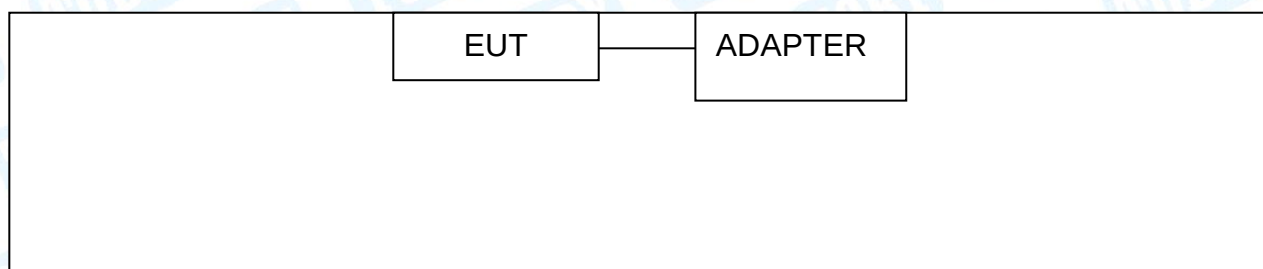
EUT Name	:	Flipper Zero		
HVIN/Models No.	:	FZ.1		
Model Difference	:	N/A		
Product Description	:	Operation Frequency:	304.5-321.95MHz 433.075-434.775MHz 915.00-927.95MHz	
		Number of Channel:	See Channel List	
		Output Power:	304.5-321.95MHz	79.91 dBuV/m (PK Max.) 72.53 dBuV/m (AV Max.)
			433.075-434.775MHz	73.73 dBuV/m (PK Max.) 66.68 dBuV/m (AV Max.)
			915.00-927.95MHz	72.75 dBuV/m (PK Max.) 65.71 dBuV/m (AV Max.)
		Antenna Gain:	Spring Antenna(-7 dBi)	
		Modulation Type:	OOK	
Power Rating	:	USB Input: DC 5V1.0A or DC 3.7V by 2100mAh Rechargeable Li-ion battery		
Software Version	:	fw-0.40.1		
Hardware Version	:	12.F7B9C6		
Remark:				
(1) The antenna gain and USB cable provided by the applicant, the verified for the RF conduction test and adapter provided by TOBY test lab.				
(2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.				
(3) Antenna information provided by the applicant.				
Flipper Zero: Portable handheld electronic device featuring virtual pet, designed for education, development and prototyping of electronics and software.				

1.3 Channel List

Channel List					
Range 1: 304.5-321.95MHz		Range 2: 433.075-434.775 MHz		Range 3: 915.00-927.95 MHz	
CH. Number	Fre.(MHz)	CH. Number	Fre.(MHz)	CH. Number	Fre.(MHz)
1	304.500	1	433.075	1	915.000
2	304.525	2	433.100	2	915.025
3	304.550	3	433.125	3	915.050
4	304.575	4	433.150	4	915.075
5	304.600	5	433.175	5	915.100
6	304.625	6	433.200	6	915.125
----	-----	----	-----	----	-----
----	-----	----	-----	----	-----
----	-----	----	-----	----	-----
351	313.250	31	433.825	261	926.5
----	-----	----	-----	----	-----
----	-----	----	-----	----	-----
----	-----	----	-----	----	-----
----	-----	----	-----	----	-----
701	321.950	69	434.775	521	927.950
Channel separation 0.025MHz		Channel separation 0.025MHz		Channel separation 0.025MHz	

1.4 Block Diagram Showing the Configuration of System Tested

Conducted Test



Radiated Test



1.5 Description of Support Units

Equipment Information				
Name	Model	FCC ID/VOC	Manufacturer	Used “√”
Adapter	HW-050200C01	-----	HUAWEI	√
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	NO	NO	0.2M	Accessory

1.6 Description of Test Mode

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 follow was evaluated respectively.

Test Items	Test Mode	Test Frequency
Conducted Emission	Continuously transmitting	434.775MHz
Radiated Emission	Continuously transmitting	304.5/313.25/321.95MHz 433.075/433.825/434.775MHz 915/926.5/927.95MHz
Bandwidth	Continuously transmitting	304.5/313.25/321.95MHz 433.075/433.825/434.775MHz 915/926.5/927.95MHz
Duty Cycle	Continuously transmitting	313.25/433.825/926.5MHz
Release Time	Normal Mode	304.5/313.25/321.95MHz 433.075/433.825/434.775MHz 915/926.5/927.95MHz

Note:

- (1) During the testing procedure, the continuously transmitting mode was programmed by the customer. And only show the worst case.
- (2) The EUT is considered a Mobile unit, and it was pre-tested on the positioned of each 3 axis: X axis, Y axis and Z axis. The worst case was found positioned on Z-plane. There for only the test data of this Z-plane were used for radiated emission measurement test.

1.7 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of transmitting mode.

RF Power Setting in Test SW:	DEF
------------------------------	-----

1.8 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.50 dB ± 3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.20 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.9 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F.,Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.

2. Test Summary

FCC Part 15 Subpart (15.231(a))					
Standard Section		Test Item	Test Sample(s)	Judgment	Remark
FCC	IC				
15.203	/	Antenna Requirement	20210916-08-1#	PASS	N/A
15.207	RSS-GEN 8.8	Conducted Emission	20210916-08-1#	PASS	N/A
15.231	RSS-210 Annex A RSS-GEN 8.9/8.10	Release Time	20210916-08-2#	PASS	N/A
		Radiation Emission	20210916-08-1#	PASS	N/A
		20 dB Bandwidth	20210916-08-2#	PASS	N/A
		Duty Cycle	20210916-08-2#	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.					

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE

4. Test Equipment

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 02, 2021	Jul. 01, 2022
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 02, 2021	Jul. 01, 2022
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 02, 2021	Jul. 01, 2022
LISN	Rohde & Schwarz	ENV216	101131	Jul. 02, 2021	Jul. 01, 2022
Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	KEYSIGT	N9020B	MY60110172	Sep. 03, 2021	Sep. 02, 2022
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 02, 2021	Jul. 01, 2022
Bilog Antenna	SCHWARZBECK	VULB 9168	1225	Dec. 05, 2021	Dec. 04, 2023
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2463	May 20, 2021	May 19, 2022
Horn Antenna	SCHWARZBECK	BBHA 9170	1118	May 20, 2021	May 19, 2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 06, 2021	Jul. 05, 2022
HF Amplifier	Tonscend	TAP9E6343	AP21C806117	Sep. 03, 2021	Sep. 02, 2022
HF Amplifier	Tonscend	TAP051845	AP21C806141	Sep. 03, 2021	Sep. 02, 2022
HF Amplifier	Tonscend	TAP0184050	AP21C806129	Sep. 03, 2021	Sep. 02, 2022
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 02, 2021	Jul. 01, 2022
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 02, 2021	Jul. 01, 2022
Vector Signal Generator	Agilent	5182B	MY59101429	Sep. 03, 2021	Sep. 02, 2022
Analog Signal Generator	Agilent	5181A	MY48180463	Sep. 03, 2021	Sep. 02, 2022
RF Control Unit	Tonsced	JS0806-2	21F8060439	Sep. 03, 2021	Sep. 02, 2022
Band Reject Filter Group	Tonsced	JS0806-F	21D8060414	Jul. 02, 2021	Jul. 01, 2022
Power Control Box	Tonsced	JS0806-4ADC	21C8060387	N/A	N/A

5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC 15.207

RSS Gen 8.8

5.1.2 Test Limit

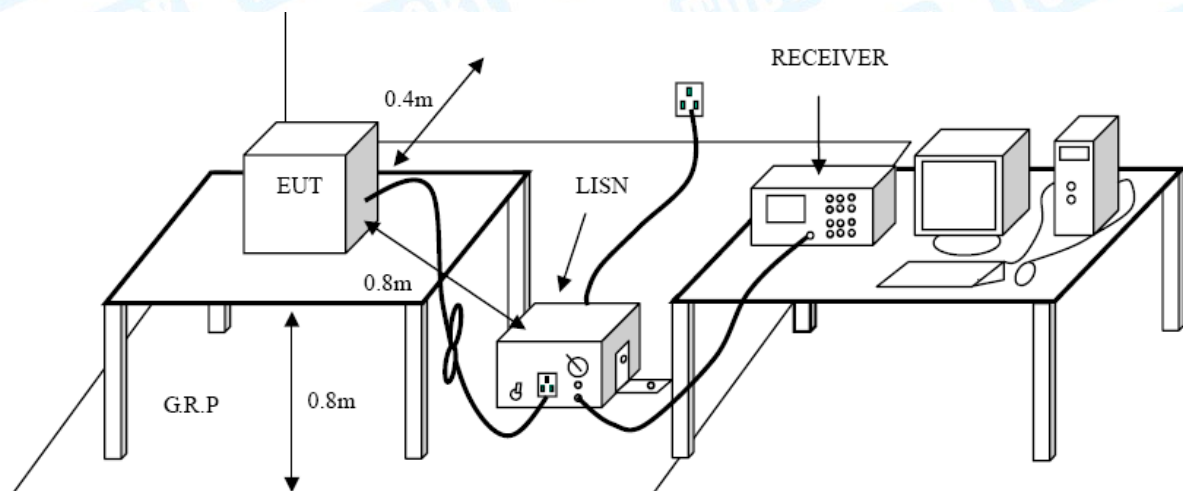
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup



5.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

The EUT must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 Test Data

Please refer to the Attachment A.

6. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard

FCC 15.231

RSS 210 Annex 1

6.1.2 Test Limit

According to FCC 15.231(a) requirement:

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

According to RSS 210 A1.1 Table A requirement:

In addition to the provisions of RSS Gen 8.9 and 8.10, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolt/meter) at 3m	Field Strength of Spurious Emissions (microvolt/meter) at 3m
40.66~40.70	2250	225
70~130	1250	125
130~174	1250 to 3750(**)	125 to 375(**)
174~260	3750	375
260~470	3750 to 12500(**)	375 to 1250(**)
Above 470	12500	1250

** Linear interpolations, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

(1) for the band 130~174 MHz, $\mu\text{V/m}$ at 3 meters= $56.81818(F)-6136.3636$;

(2) for the band 260~470 MHz, $\mu\text{V/m}$ at 3 meter= $41.6667(F)-7083.3333$.

(3) The maximum permitted unwanted emissions level is 20 dB below the maximum permitted fundamental level. In addition field strength of any emissions which appear inside of the restriction band shall not exceed the general radiated emissions limits in FCC Part15.209.

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	$2400/F(\text{KHz})$	300
0.490~1.705	$24000/F(\text{KHz})$	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3

216~960	200	3
Above 960	500	3

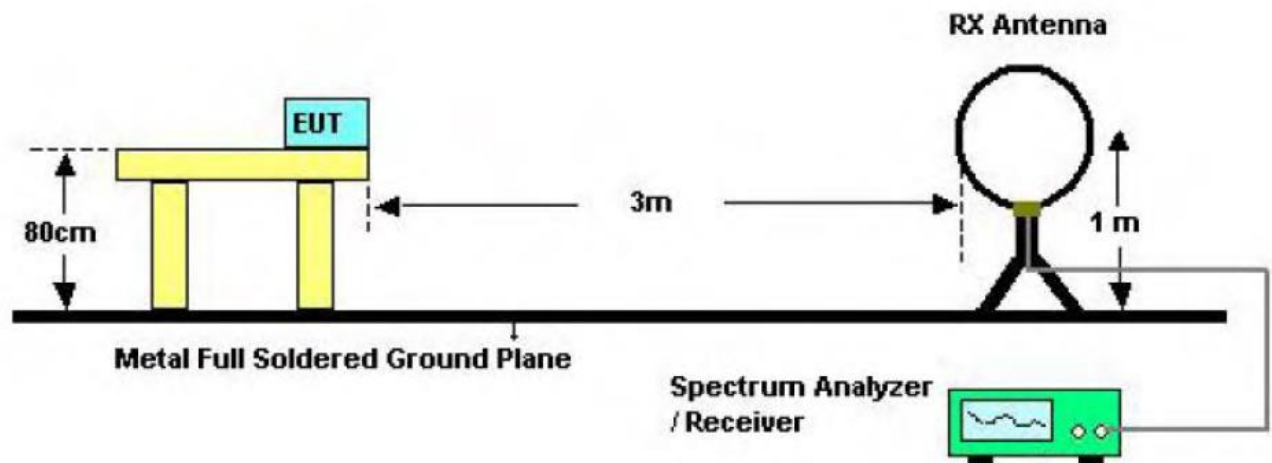
Note:

- (1) The tighter limit applies at the band edges.
- (2) For above 30MHz:
 $\text{Emission Level(dBuV/m)} = 20\log \text{Emission Level(uV/m)}$
 For 0.009~0.490MHz:
 $\text{Emission Level(dBuV/m)} = 20\log \text{Emission Level(uV/m)} + 40\log(300/3)$
 For 0.049~30MHz:
 $\text{Emission Level(dBuV/m)} = 20\log \text{Emission Level(uV/m)} + 40\log(30/3)$

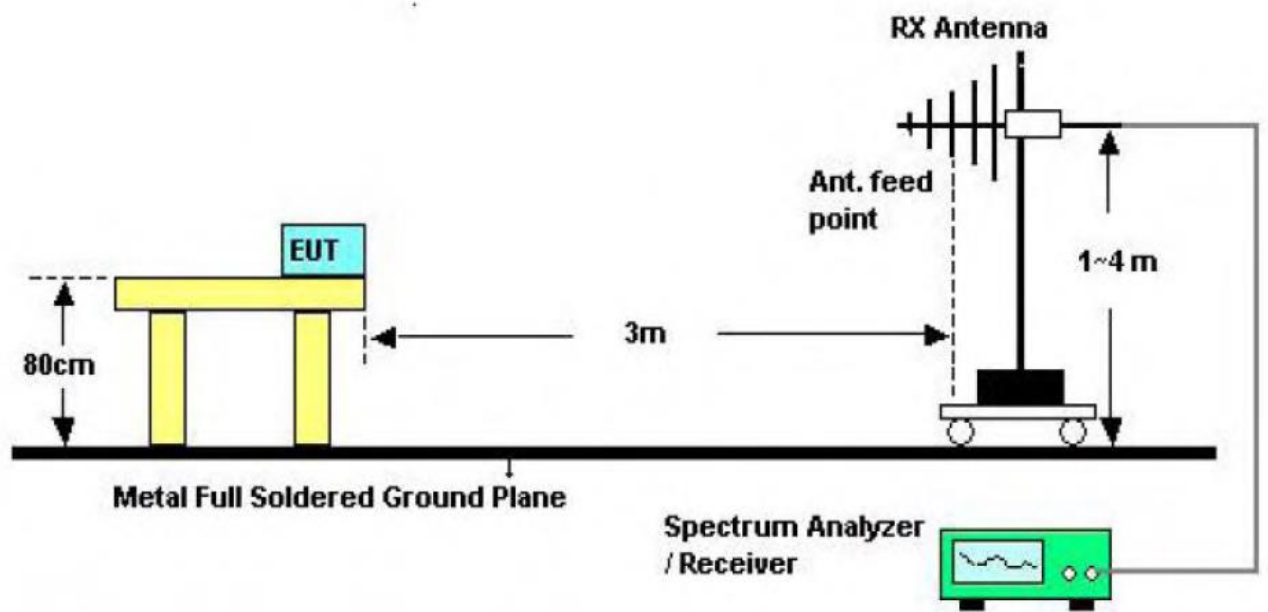
So the field strength of emission limits have been calculated in below table.

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolt/meter) at 3m
304.5-321.95MHz	74.97(Average)
	94.97(Peak)
433.075-434.775MHz	80.80 (Average)
	100.80 (Peak)
915.00-927.95MHz	81.94 (Average)
	101.94 (Peak)

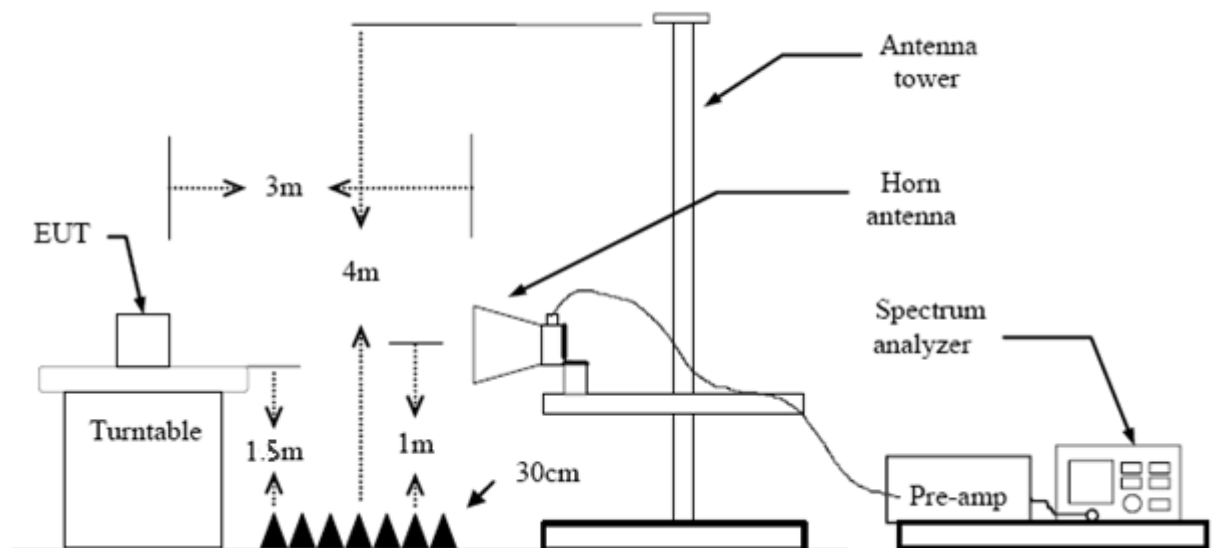
6.2 Test Setup



Below 30MHz Test Setup



Bellow 1000MHz Test Setup



Above 1GHz Test Setup

6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) 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.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.6 Test Data

Please refer to the Attachment B.

7. Bandwidth

7.1 Test Standard and Limit

7.1.1 Test Standard

FCC 15.231

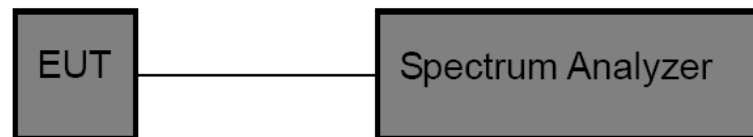
RSS 210 Annex 1

7.1.2 Test Limit

The 99% bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. So the emission bandwidth limits have been calculated in below table.

Fundamental Frequency	20 dB Bandwidth Limits (kHz)
304.5-321.95MHz	761.250
433.075-434.775MHz	1082.69
915.00-927.95MHz	2287.50

7.2 Test Setup



7.3 Test Procedure

- (1) Set Spectrum Analyzer Center Frequency= Fundamental Frequency, RBW=10 kHz, VBW= 30 kHz, Span= 1 MHz.
- (2) Measured the spectrum width with power higher than 20 dB below carrier.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Condition

The Equipment Under Test was Programmed to be in continuously transmitting mode.

7.6 Test Data

Please refer to the Attachment B.

8. Release Time Measurement

8.1 Test Standard and Limit

8.1.1 Test Standard

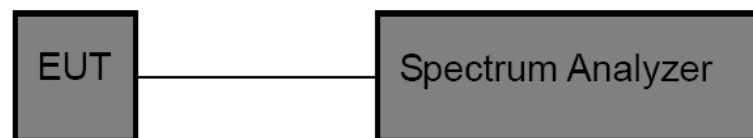
FCC 15.231

RSS 210 Annex A&D

8.1.2 Test Limit

According to FCC 15.231a and RSS 210 Annex D, a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

8.2 Test Setup



8.3 Test Procedure

- (1) Setup the EUT as show in the block diagram above.
- (2) Set Spectrum Analyzer Centre Frequency= Fundamental Frequency, RBW=100 kHz, VBW= 300 kHz, Span= 0 Hz. Sweep Time= 5 Seconds.
- (3) Setup the EUT as normal operation and press Transmitter button.
- (4) Set Spectrum Analyzer View, Delta Mark time.

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Condition

The EUT was set to work in transmitting mode.

8.6 Test Data

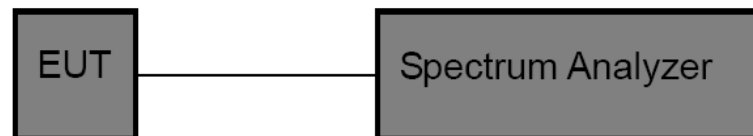
Please refer to the Attachment C.

9. Duty Cycle

9.1 Test Standard and Limit

- 9.1.1 Test Standard
 - FCC 15.231
 - RSS 210 Annex A&D

9.2 Test Setup



9.3 Test Procedure

- (1) The EUT was placed on a turntable which is 0.8m above ground plane.
- (2) Set EUT operating in continuous transmitting mode.
- (3) Set the Spectrum Analyzer to the transmitter carrier frequency, and set the spectrum analyzer resolution bandwidth (RBW) to 100 kHz and video bandwidth (VBW) to 300 kHz, Span was set to 0 Hz.
- (4) The Duty Cycle was measured and recorded.

9.4 Deviation From Test Standard

No deviation

9.5 EUT Operating Condition

The EUT was programmed to be in transmitting mode.

9.6 Test Data

Please refer to the Attachment D.

10. Antenna Requirement

10.1 Standard Requirement

10.1.1 Standard

FCC Part 15.203

10.1.2 Requirement

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 shall be considered sufficient to comply with the provisions of this Section. 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.

10.1 Deviation From Test Standard

No deviation

10.2 Antenna Connected Construction

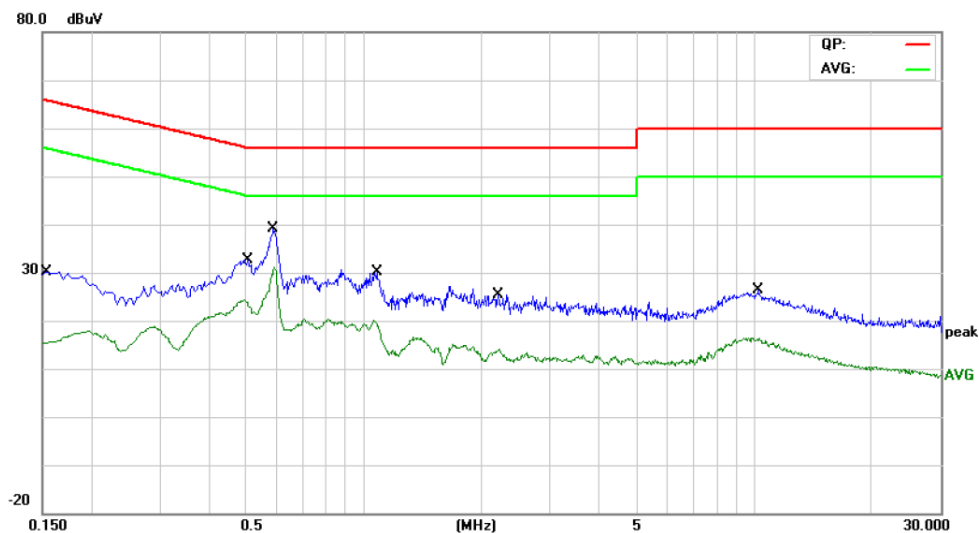
The gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

The EUT antenna is an Spring Antenna. It complies with the standard requirement.

Antenna Type
☒ Permanent attached antenna
☐ Unique connector antenna
☐ Professional installation antenna

Attachment A-- Conducted Emission Test Data

Temperature:	24.6°C	Relative Humidity:	42%
Test Voltage:	AC 120V/60Hz		
Terminal:	Line		
Test Mode:	TX 434.775MHz		
Remark:	Only worse case is reported.		

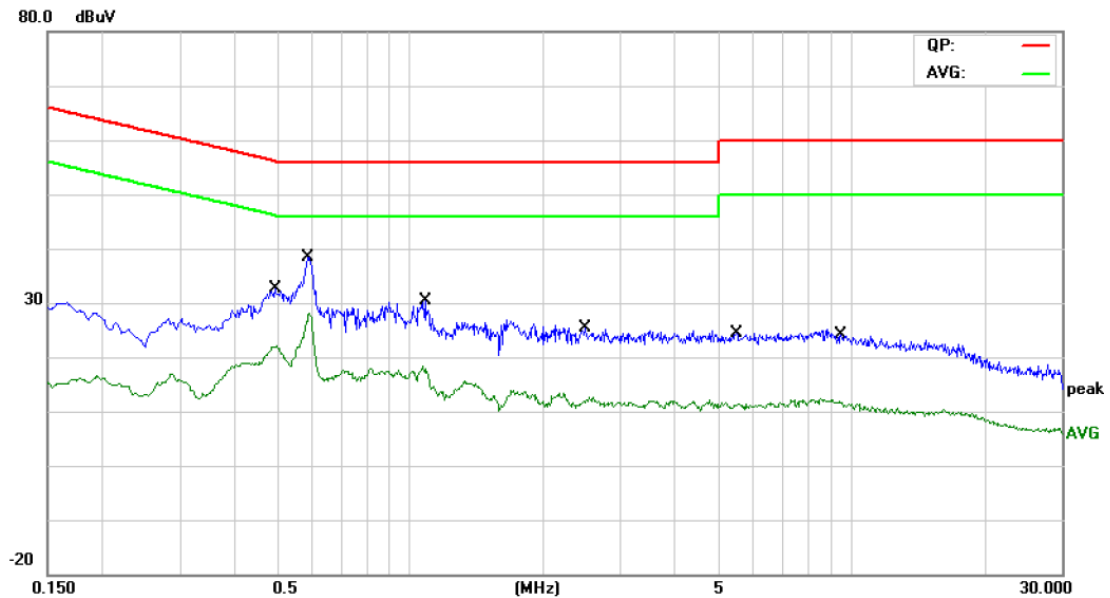


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV	dBuV	dB	
1		0.1539	12.40	11.62	24.02	65.78	-41.76	QP
2		0.1539	2.99	11.62	14.61	55.78	-41.17	AVG
3		0.5060	15.61	11.49	27.10	56.00	-28.90	QP
4		0.5060	11.89	11.49	23.38	46.00	-22.62	AVG
5		0.5860	22.04	11.45	33.49	56.00	-22.51	QP
6	*	0.5860	19.17	11.45	30.62	46.00	-15.38	AVG
7		1.0820	12.76	11.14	23.90	56.00	-32.10	QP
8		1.0820	7.98	11.14	19.12	46.00	-26.88	AVG
9		2.2100	7.78	10.48	18.26	56.00	-37.74	QP
10		2.2100	3.18	10.48	13.66	46.00	-32.34	AVG
11		10.3500	9.91	10.23	20.14	60.00	-39.86	QP
12		10.3500	5.25	10.23	15.48	50.00	-34.52	AVG

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = QuasiPeak/Average (dBuV) - Limit (dBuV)

Temperature:	24.6°C	Relative Humidity:	42%
Test Voltage:	AC 120V/60Hz		
Terminal:	Neutral		
Test Mode:	TX 434.775MHz		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.4940	15.12	11.51	26.63	56.10	-29.47	QP
2		0.4940	9.72	11.51	21.23	46.10	-24.87	AVG
3		0.5860	21.16	11.48	32.64	56.00	-23.36	QP
4	*	0.5860	15.77	11.48	27.25	46.00	-18.75	AVG
5		1.0820	11.62	11.14	22.76	56.00	-33.24	QP
6		1.0820	5.72	11.14	16.86	46.00	-29.14	AVG
7		2.4980	6.35	10.32	16.67	56.00	-39.33	QP
8		2.4980	0.76	10.32	11.08	46.00	-34.92	AVG
9		5.5020	6.01	10.06	16.07	60.00	-43.93	QP
10		5.5020	0.33	10.06	10.39	50.00	-39.61	AVG
11		9.4740	6.07	10.12	16.19	60.00	-43.81	QP
12		9.4740	0.61	10.12	10.73	50.00	-39.27	AVG

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = QuasiPeak/Average (dBuV) - Limit (dBuV)

Attachment B-- Radiated Emission Test Data

9 KHz-30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz-1GHz

Temperature:	24.3℃	Relative Humidity:		45%			
Test Voltage:	DC 3.7V						
Ant. Pol.	Horizontal						
Test Mode:	TX Mode 304.500MHz						
Remark:	No report for the emission which more than 20 dB below the prescribed limit.						

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	122.8340	36.88	-23.11	13.77	43.50	-29.73	peak
2	161.4742	36.85	-21.54	15.31	43.50	-28.19	peak
3 *	304.6099	91.63	-20.61	71.02	94.97	-23.95	peak
4 X	304.6099	84.25	-20.61	63.64	74.97	-11.33	AVG
5	462.3455	36.90	-16.67	20.23	46.00	-25.77	peak
6 !	609.9217	55.42	-13.10	42.32	74.97	-32.65	peak
7 !	916.0687	50.22	-8.31	41.91	74.97	-33.06	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.38

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 304.500MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	66.9669	38.24	-24.09	14.15	40.00	-25.85	peak
2	151.0666	37.71	-21.71	16.00	43.50	-27.50	peak
3 *	304.6099	94.37	-20.61	73.76	94.97	-21.21	peak
4 X	304.6099	86.99	-20.61	66.38	74.97	-8.59	AVG
5	477.1694	42.64	-16.20	26.44	46.00	-19.56	peak
6	609.9217	46.29	-13.10	33.19	74.97	-41.78	peak
7	916.0687	47.49	-8.31	39.18	74.97	-35.79	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.38

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 313.250MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.5859	44.88	-22.62	22.26	40.00	-17.74	peak
2	210.0481	42.75	-23.75	19.00	43.50	-24.50	peak
3 *	313.2760	98.88	-20.49	78.39	94.97	-16.58	peak
4 X	313.2760	91.50	-20.49	71.01	74.97	-3.96	AVG
5	627.2738	52.81	-12.82	39.99	74.97	-34.98	peak
6 !	942.1305	52.21	-8.09	44.12	74.97	-30.85	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.38

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 313.250MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	48.3316	38.36	-22.63	15.73	40.00	-24.27	peak	P
2	125.4457	38.51	-22.95	15.56	43.50	-27.94	peak	P
3	164.9074	37.86	-21.83	16.03	43.50	-27.47	peak	P
4 *	313.2760	89.29	-20.49	68.80	94.97	-26.17	peak	P
5 X	313.2760	81.91	-20.49	61.42	74.97	-13.55	AVG	P
6	687.1506	37.66	-11.95	25.71	74.97	-49.26	peak	P
7	942.1305	46.72	-8.09	38.63	74.97	-36.34	peak	P

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.38

Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 321.950MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.0566	38.12	-22.56	15.56	40.00	-24.44	peak
2	127.2176	39.72	-22.84	16.88	43.50	-26.62	peak
3	164.9075	39.31	-21.83	17.48	43.50	-26.02	peak
4 *	322.1884	100.23	-20.32	79.91	94.97	-15.06	peak
5 X	322.1884	92.85	-20.32	72.53	74.97	-2.44	AVG
6	645.1195	49.59	-12.58	37.01	74.97	-37.96	peak
7	968.9338	50.01	-7.75	42.26	74.97	-32.71	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.38

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 321.950MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	69.1141	37.69	-24.24	13.45	40.00	-26.55	peak
2	140.8351	36.73	-22.01	14.72	43.50	-28.78	peak
3	173.8135	36.83	-22.58	14.25	43.50	-29.25	peak
4 X	322.1885	81.18	-20.32	60.86	74.97	-14.11	AVG
5 *	322.1886	88.56	-20.32	68.24	94.97	-26.73	peak
6	645.1195	38.76	-12.58	26.18	74.97	-48.79	peak
7	968.9338	47.93	-7.75	40.18	74.97	-34.79	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.38

Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 433.075MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	48.3316	38.59	-22.63	15.96	40.00	-24.04	peak
2	143.3260	37.15	-21.94	15.21	43.50	-28.29	peak
3	258.3264	37.79	-22.16	15.63	46.00	-30.37	peak
4 X	434.0650	84.14	-17.46	66.68	80.80	-14.12	AVG
5 *	434.0651	91.19	-17.46	73.73	100.80	-27.07	peak
6	564.6388	38.38	-14.06	24.32	46.00	-21.68	peak
7 !	869.1302	53.07	-8.92	44.15	80.80	-36.65	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 433.075MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	56.7917	44.17	-23.28	20.89	40.00	-19.11	peak
2	158.1123	38.61	-21.49	17.12	43.50	-26.38	peak
3	173.8135	37.57	-22.58	14.99	43.50	-28.51	peak
4	289.0020	37.91	-20.99	16.92	46.00	-29.08	peak
5 X	434.0650	76.46	-17.46	59.00	80.80	-21.80	AVG
6 *	434.0650	83.51	-17.46	66.05	100.80	-34.75	peak
7 !	869.1302	51.55	-8.92	42.63	80.80	-38.17	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 433.825MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	59.0251	38.59	-23.51	15.08	40.00	-24.92	peak
2	84.4054	37.37	-26.59	10.78	40.00	-29.22	peak
3	144.3348	38.24	-21.90	16.34	43.50	-27.16	peak
4	187.7530	40.26	-23.50	16.76	43.50	-26.74	peak
5 X	434.0650	84.02	-17.46	66.56	80.80	-14.24	AVG
6 *	434.0650	91.07	-17.46	73.61	100.80	-27.19	peak
7 !	869.1302	52.96	-8.92	44.04	80.80	-36.76	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 433.825MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.4089	37.91	-22.60	15.31	40.00	-24.69	peak
2	66.0342	39.49	-24.02	15.47	40.00	-24.53	peak
3	135.9822	38.89	-22.29	16.60	43.50	-26.90	peak
4 X	434.0650	77.27	-17.46	59.81	80.80	-20.99	AVG
5 *	434.0651	84.32	-17.46	66.86	100.80	-33.94	peak
6	647.3856	36.92	-12.53	24.39	46.00	-21.61	peak
7 !	869.1302	51.10	-8.92	42.18	80.80	-38.62	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 434.775MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	45.0583	38.84	-22.80	16.04	40.00	-23.96	peak
2	55.0274	38.18	-23.08	15.10	40.00	-24.90	peak
3	141.3298	38.28	-21.99	16.29	43.50	-27.21	peak
4 *	435.5898	89.78	-17.43	72.35	100.80	-28.45	peak
5 X	435.5898	82.73	-17.43	65.30	80.80	-15.50	AVG
6	564.6389	38.08	-14.06	24.02	46.00	-21.98	peak
7 !	872.1832	52.51	-8.87	43.64	80.80	-37.16	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 434.775MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	33.7986	40.94	-23.12	17.82	40.00	-22.18	peak
2	59.4405	37.57	-23.54	14.03	40.00	-25.97	peak
3	133.1511	38.60	-22.47	16.13	43.50	-27.37	peak
4	170.1948	39.30	-22.27	17.03	43.50	-26.47	peak
5 *	435.5898	84.41	-17.43	66.98	100.80	-33.92	peak
6 X	435.5898	77.36	-17.43	59.93	80.80	-20.87	AVG
7	872.1832	46.12	-8.87	37.25	80.80	-43.55	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 915MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	42.8998	37.97	-22.90	15.07	40.00	-24.93	peak
2	46.6664	38.43	-22.71	15.72	40.00	-24.28	peak
3	67.2022	38.94	-24.11	14.83	40.00	-25.17	peak
4	150.0108	37.92	-21.74	16.18	43.50	-27.32	peak
5	306.7537	39.58	-20.58	19.00	46.00	-27.00	peak
6 X	916.0686	74.02	-8.31	65.71	81.94	-16.23	AVG
7 *	916.0687	81.06	-8.31	72.75	101.94	-29.19	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.04

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 915MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	51.3005	38.73	-22.69	16.04	40.00	-23.96	peak
2	121.1231	37.64	-23.20	14.44	43.50	-29.06	peak
3	151.5972	38.15	-21.69	16.46	43.50	-27.04	peak
4	322.1886	37.18	-20.32	16.86	46.00	-29.14	peak
5	478.8456	37.16	-16.14	21.02	46.00	-24.98	peak
6 X	916.0686	66.74	-8.31	58.43	81.94	-23.51	AVG
7 *	916.0687	73.78	-8.31	65.47	101.94	-36.47	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.04

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 926.50MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	51.4807	38.06	-22.71	15.35	40.00	-24.65	peak
2	140.3421	38.25	-22.03	16.22	43.50	-27.28	peak
3	180.0165	39.31	-23.13	16.18	43.50	-27.32	peak
4	212.2695	39.49	-23.67	15.82	43.50	-27.68	peak
5	645.1195	38.46	-12.58	25.88	46.00	-20.12	peak
6 X	929.0081	70.57	-8.12	62.45	81.94	-19.49	AVG
7 *	929.0082	77.61	-8.12	69.49	101.94	-32.45	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.04

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 926.50MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	43.8119	38.03	-22.86	15.17	40.00	-24.83	peak
2	56.3948	37.76	-23.23	14.53	40.00	-25.47	peak
3	150.5378	38.12	-21.73	16.39	43.50	-27.11	peak
4	325.5958	40.15	-20.23	19.92	46.00	-26.08	peak
5	734.4913	38.34	-11.14	27.20	46.00	-18.80	peak
6 X	929.0081	64.40	-8.12	56.28	81.94	-25.66	AVG
7 *	929.0082	71.44	-8.12	63.32	101.94	-38.62	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.04

Temperature:	24.3℃	Relative Humidity:		45%			
Test Voltage:	DC 3.7V						
Ant. Pol.	Horizontal						
Test Mode:	TX Mode 927.95MHz						
Remark:	No report for the emission which more than 20 dB below the prescribed limit.						
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	65.3432	38.85	-23.98	14.87	40.00	-25.13	peak
2	161.4742	38.37	-21.54	16.83	43.50	-26.67	peak
3	562.6624	37.86	-14.12	23.74	46.00	-22.26	peak
4	614.2142	37.46	-13.03	24.43	46.00	-21.57	peak
5	684.7454	37.22	-12.01	25.21	46.00	-20.79	peak
6 X	929.0081	69.91	-8.12	61.79	81.94	-20.15	AVG
7 *	929.0082	76.95	-8.12	68.83	101.94	-33.11	peak

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)

Average Value=Peak Value-7.04

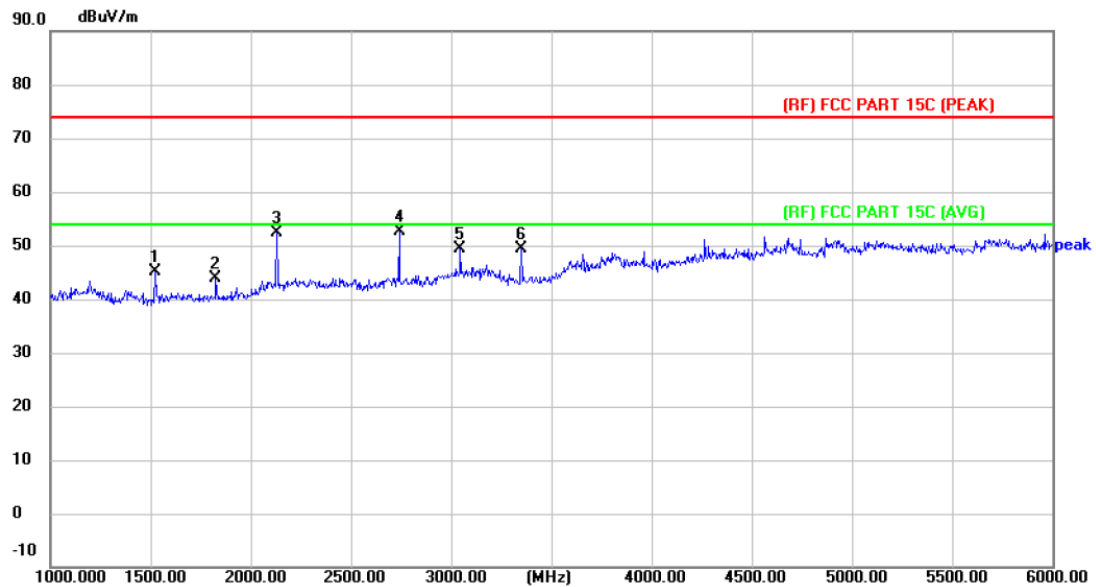
Temperature:	24.3℃	Relative Humidity:		45%			
Test Voltage:	DC 3.7V						
Ant. Pol.	Vertical						
Test Mode:	TX Mode 927.95MHz						
Remark:	No report for the emission which more than 20 dB below the prescribed limit.						
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.5860	37.86	-22.62	15.24	40.00	-24.76	peak
2	67.4382	37.88	-24.12	13.76	40.00	-26.24	peak
3	141.8262	37.82	-21.98	15.84	43.50	-27.66	peak
4	239.9874	39.41	-22.53	16.88	46.00	-29.12	peak
5	758.0408	38.87	-10.62	28.25	46.00	-17.75	peak
6 X	929.0081	67.21	-8.12	59.09	81.94	-22.85	AVG
7 *	929.0082	74.25	-8.12	66.13	101.94	-35.81	peak

Emission Level= Read Level+ Correct Factor

Average Value=Peak Value-7.04

Above 1G

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 304.5MHz		
Remark:	The peak value < average limit, So only show the peak value.		

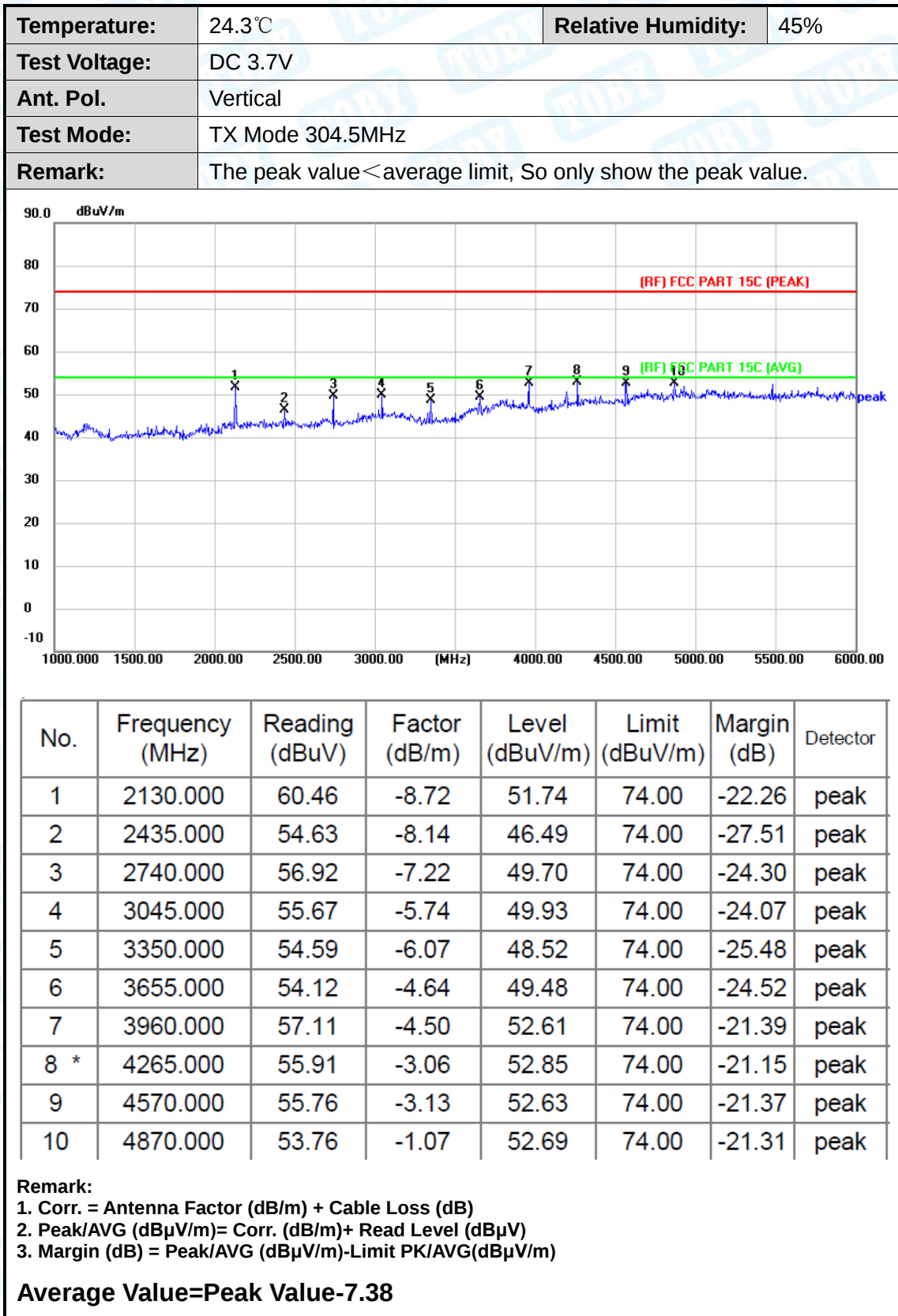


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1525.000	57.09	-11.84	45.25	74.00	-28.75	peak
2	1825.000	54.07	-10.25	43.82	74.00	-30.18	peak
3	2130.000	61.08	-8.59	52.49	74.00	-21.51	peak
4 *	2740.000	59.81	-7.15	52.66	74.00	-21.34	peak
5	3045.000	55.39	-6.02	49.37	74.00	-24.63	peak
6	3350.000	55.47	-6.05	49.42	74.00	-24.58	peak

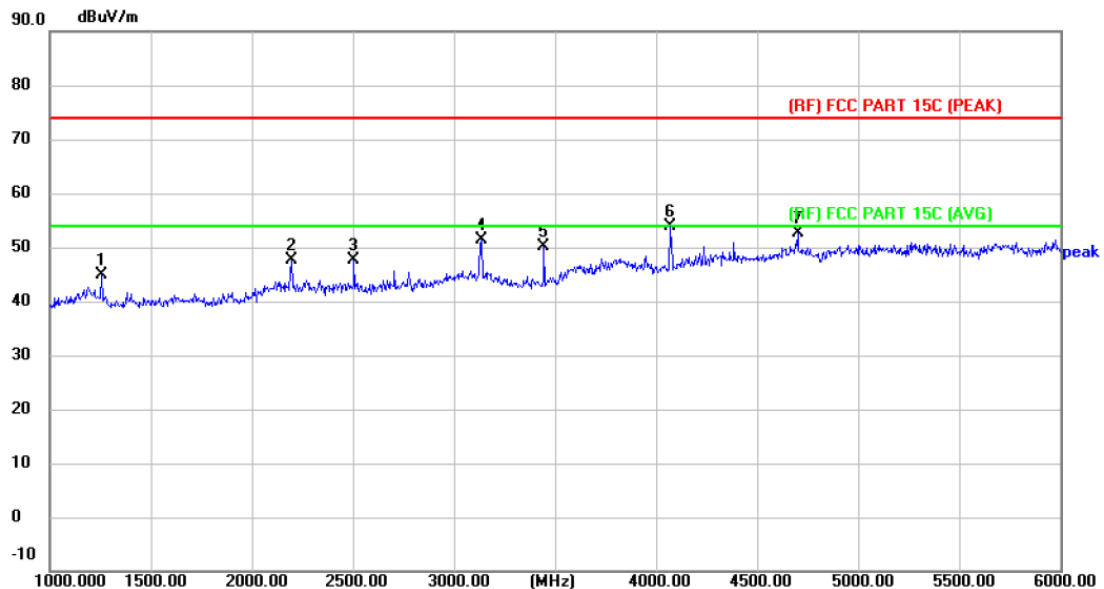
Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.38



Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 313.25MHz		
Remark:	The peak value < average limit, So only show the peak value.		



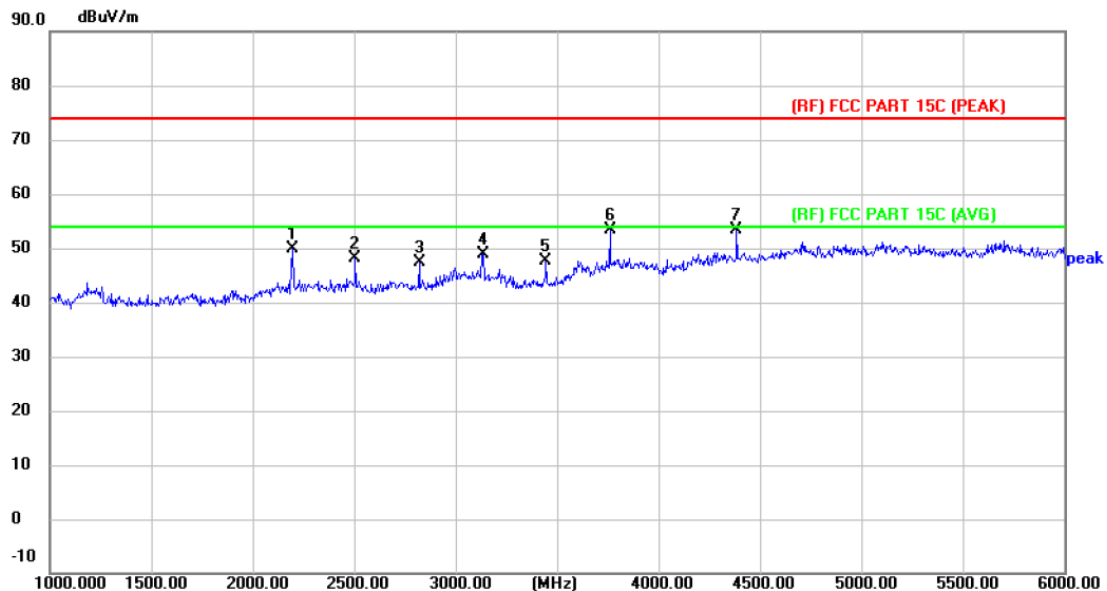
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1255.000	55.46	-10.54	44.92	74.00	-29.08	peak
2	2195.000	56.35	-8.71	47.64	74.00	-26.36	peak
3	2505.000	55.31	-7.59	47.72	74.00	-26.28	peak
4	3135.000	56.78	-5.44	51.34	74.00	-22.66	peak
5	3445.000	56.02	-5.85	50.17	74.00	-23.83	peak
6 *	4070.000	58.15	-4.34	53.81	74.00	-20.19	peak
7	4700.000	54.14	-1.53	52.61	74.00	-21.39	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.38

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 313.25MHz		
Remark:	The peak value < average limit, So only show the peak value.		



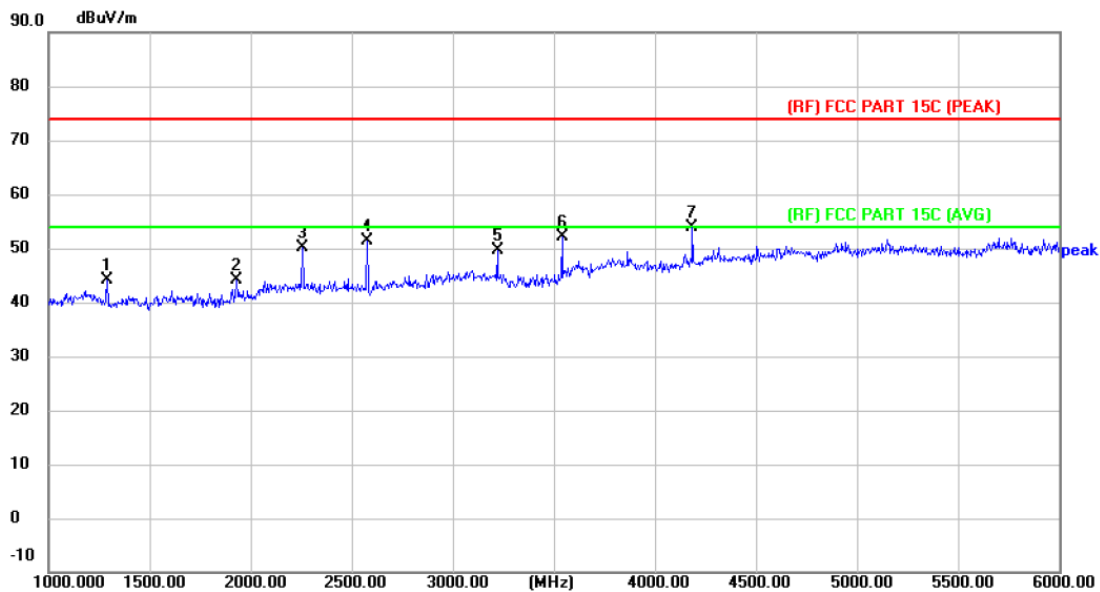
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2195.000	58.58	-8.81	49.77	74.00	-24.23	peak
2	2505.000	55.42	-7.36	48.06	74.00	-25.94	peak
3	2820.000	54.88	-7.60	47.28	74.00	-26.72	peak
4	3135.000	54.22	-5.28	48.94	74.00	-25.06	peak
5	3445.000	53.44	-5.71	47.73	74.00	-26.27	peak
6 *	3760.000	57.85	-4.42	53.43	74.00	-20.57	peak
7	4385.000	56.42	-3.04	53.38	74.00	-20.62	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.38

Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 321.95MHz		
Remark:	The peak value < average limit, So only show the peak value.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1290.000	55.08	-10.99	44.09	74.00	-29.91	peak
2	1930.000	53.75	-9.60	44.15	74.00	-29.85	peak
3	2255.000	58.83	-8.80	50.03	74.00	-23.97	peak
4	2575.000	59.34	-7.85	51.49	74.00	-22.51	peak
5	3220.000	55.17	-5.49	49.68	74.00	-24.32	peak
6	3540.000	57.15	-5.06	52.09	74.00	-21.91	peak
7 *	4185.000	57.58	-3.78	53.80	74.00	-20.20	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.38

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 321.95MHz		
Remark:	The peak value < average limit, So only show the peak value.		

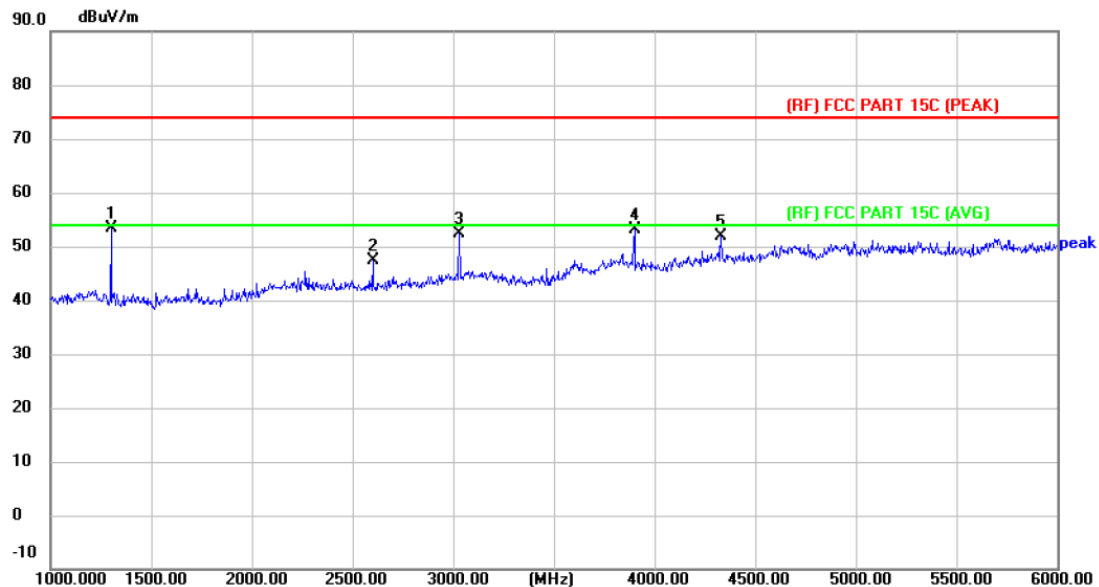
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2255.000	56.80	-8.80	48.00	74.00	-26.00	peak
2	2895.000	57.04	-7.12	49.92	74.00	-24.08	peak
3	3220.000	58.29	-5.43	52.86	74.00	-21.14	peak
4 *	3540.000	58.49	-5.09	53.40	74.00	-20.60	peak
5	3865.000	56.38	-4.11	52.27	74.00	-21.73	peak
6	4185.000	56.64	-3.79	52.85	74.00	-21.15	peak
7	4505.000	56.41	-3.50	52.91	74.00	-21.09	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.38

Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 433.075MHz		
Remark:	The peak value < average limit, So only show the peak value.		

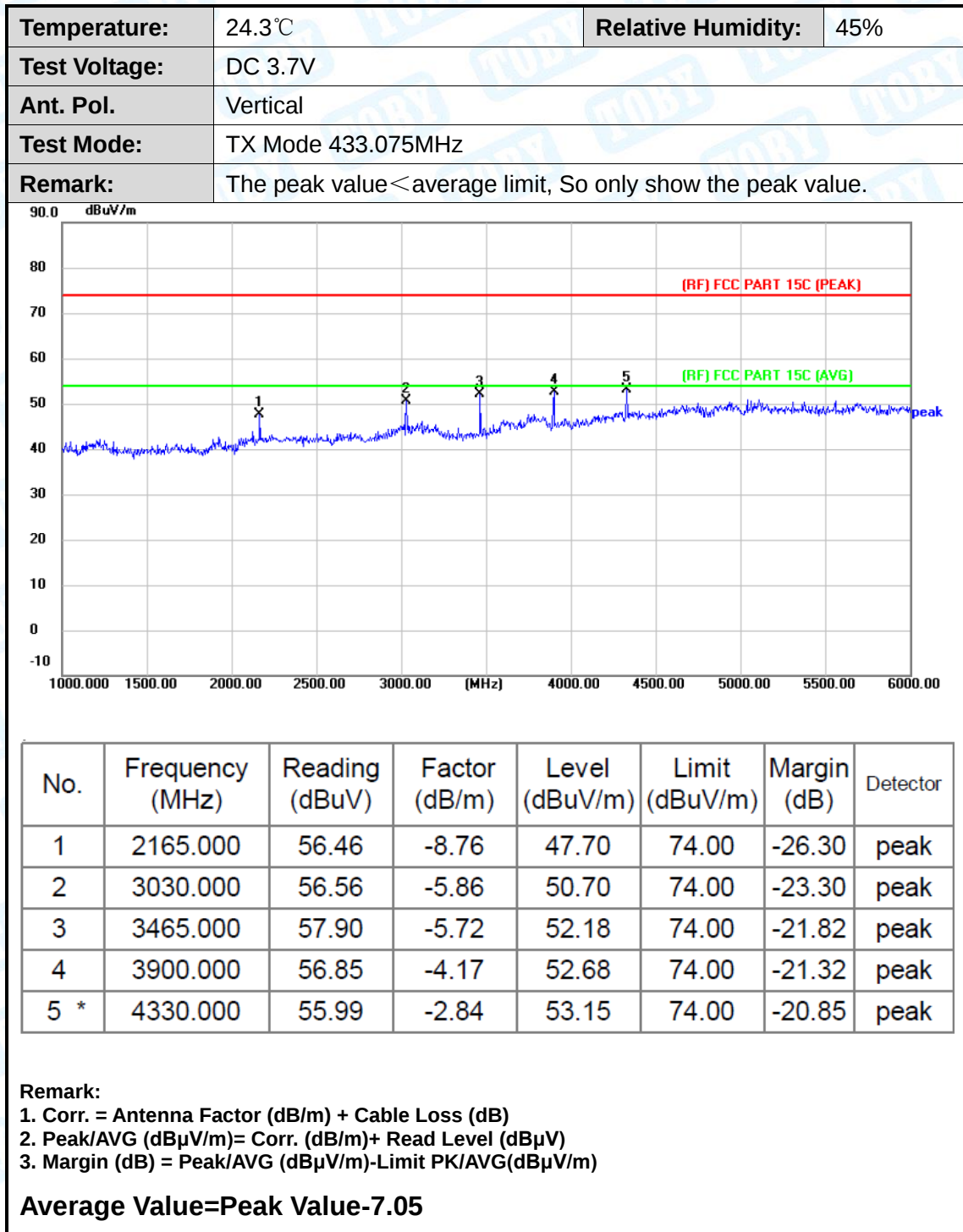


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	1300.000	64.49	-11.11	53.38	74.00	-20.62	peak
2	2600.000	55.33	-7.95	47.38	74.00	-26.62	peak
3	3030.000	58.44	-6.17	52.27	74.00	-21.73	peak
4	3900.000	57.54	-4.51	53.03	74.00	-20.97	peak
5	4330.000	54.84	-2.92	51.92	74.00	-22.08	peak

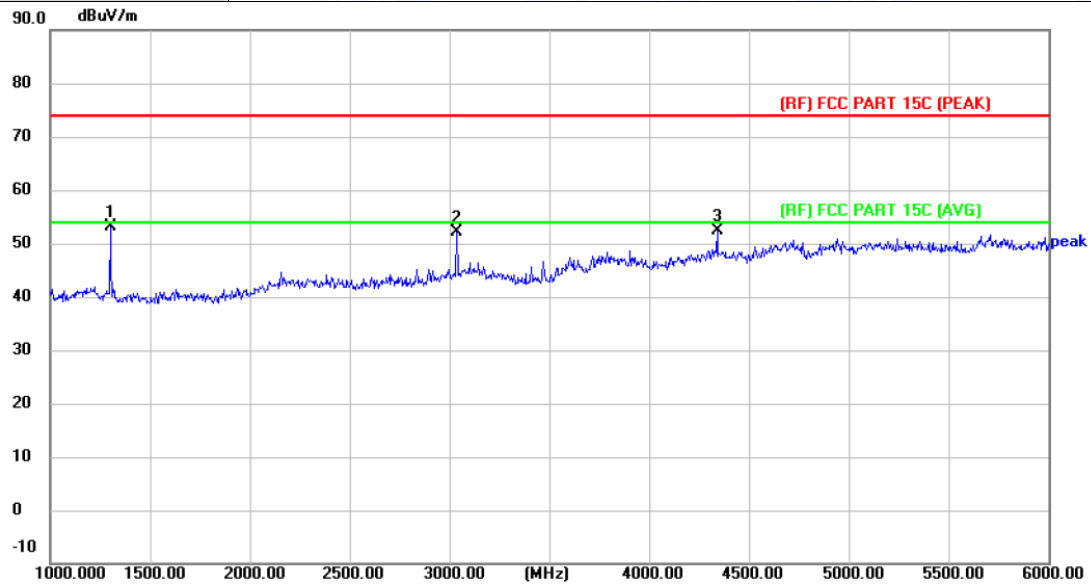
Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.05



Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 433.825MHz		
Remark:	The peak value < average limit, So only show the peak value.		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	1300.000	64.27	-11.11	53.16	74.00	-20.84	peak
2	3035.000	58.22	-6.12	52.10	74.00	-21.90	peak
3	4340.000	55.30	-2.95	52.35	74.00	-21.65	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)

3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 433.825MHz		
Remark:	The peak value < average limit, So only show the peak value.		

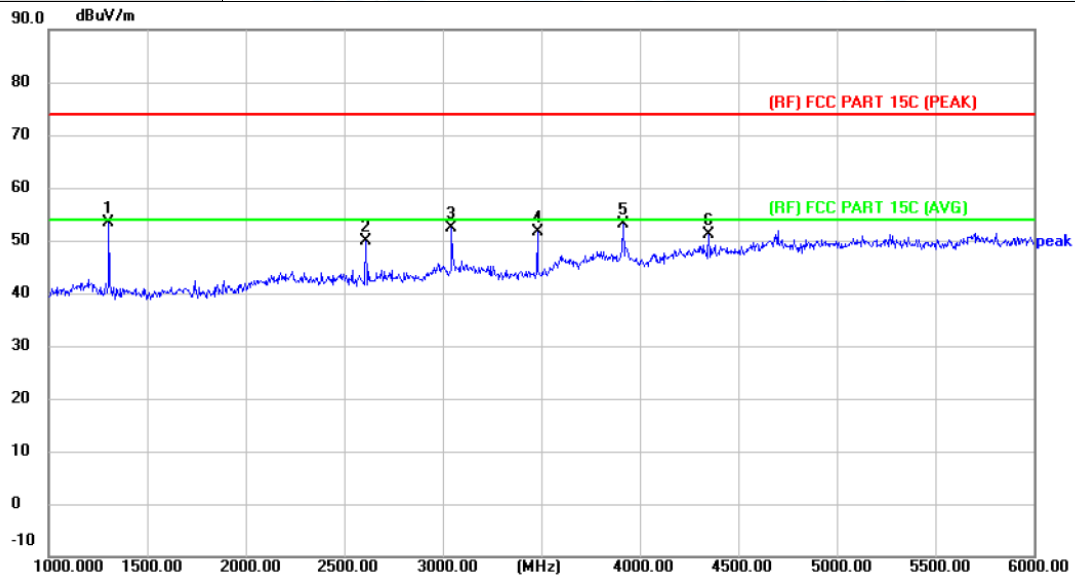
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1300.000	54.92	-10.53	44.39	74.00	-29.61	peak
2	2170.000	54.46	-8.77	45.69	74.00	-28.31	peak
3	2605.000	57.47	-8.06	49.41	74.00	-24.59	peak
4 *	3035.000	59.08	-5.82	53.26	74.00	-20.74	peak
5	3470.000	58.21	-5.73	52.48	74.00	-21.52	peak
6	3905.000	56.78	-4.19	52.59	74.00	-21.41	peak
7	4340.000	55.32	-2.88	52.44	74.00	-21.56	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.05

Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 434.775MHz		
Remark:	The peak value < average limit, So only show the peak value.		



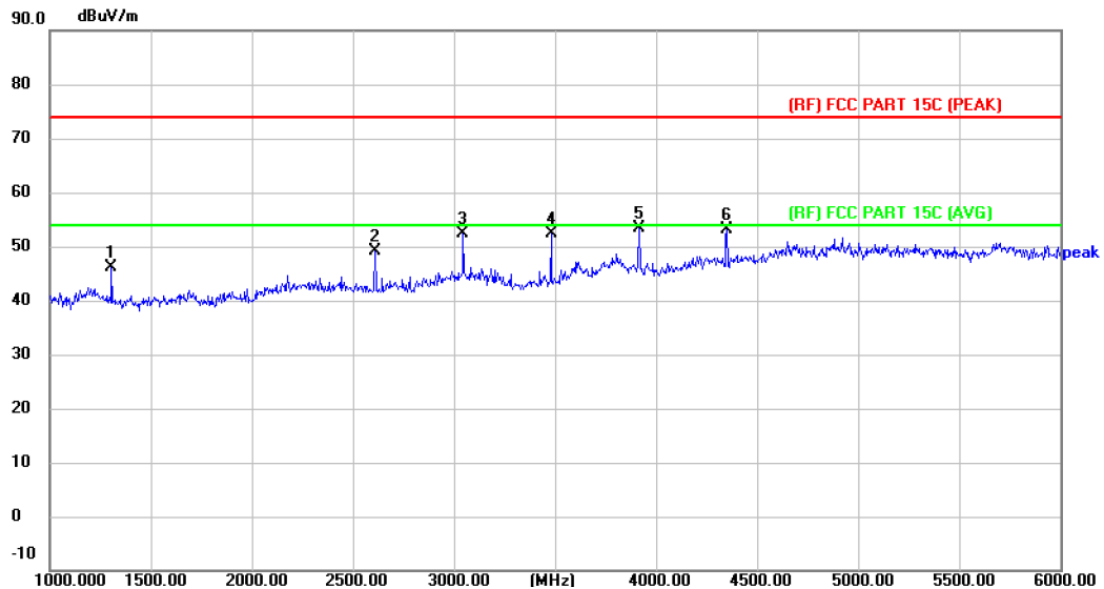
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	1305.000	64.42	-11.09	53.33	74.00	-20.67	peak
2	2610.000	57.84	-7.85	49.99	74.00	-24.01	peak
3	3045.000	58.32	-6.02	52.30	74.00	-21.70	peak
4	3480.000	57.40	-5.84	51.56	74.00	-22.44	peak
5	3915.000	57.53	-4.50	53.03	74.00	-20.97	peak
6	4350.000	54.15	-2.97	51.18	74.00	-22.82	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.05

Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Vertical		
Test Mode:	TX Mode 433.775MHz		
Remark:	The peak value < average limit, So only show the peak value.		



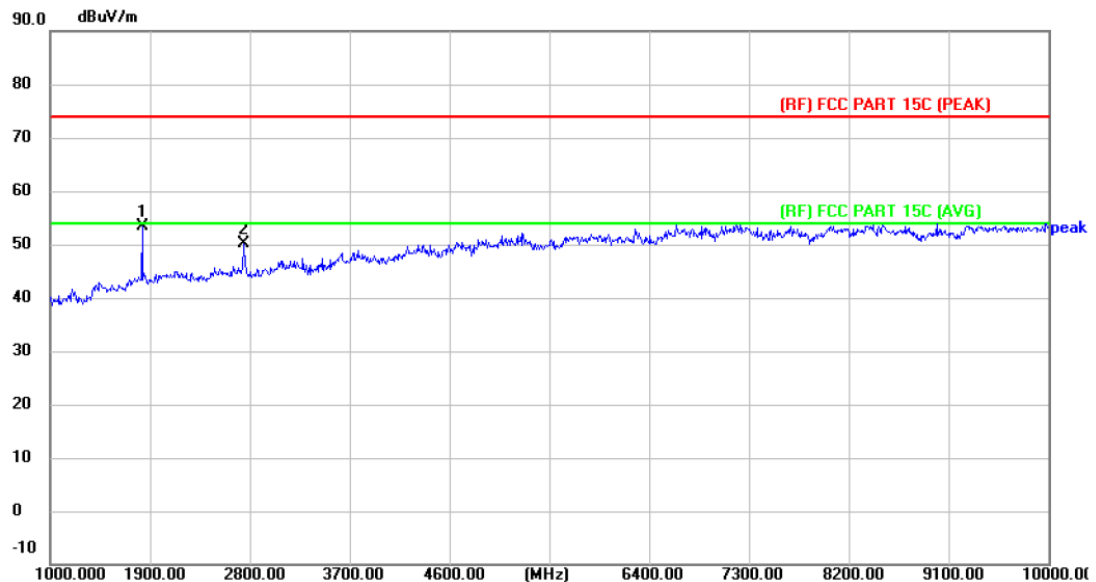
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1305.000	56.63	-10.56	46.07	74.00	-27.93	peak
2	2610.000	57.18	-8.00	49.18	74.00	-24.82	peak
3	3045.000	58.23	-5.74	52.49	74.00	-21.51	peak
4	3480.000	58.01	-5.73	52.28	74.00	-21.72	peak
5 *	3915.000	57.52	-4.26	53.26	74.00	-20.74	peak
6	4350.000	56.10	-2.91	53.19	74.00	-20.81	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.05

Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 915.00MHz		
Remark:	The peak value < average limit, So only show the peak value.		

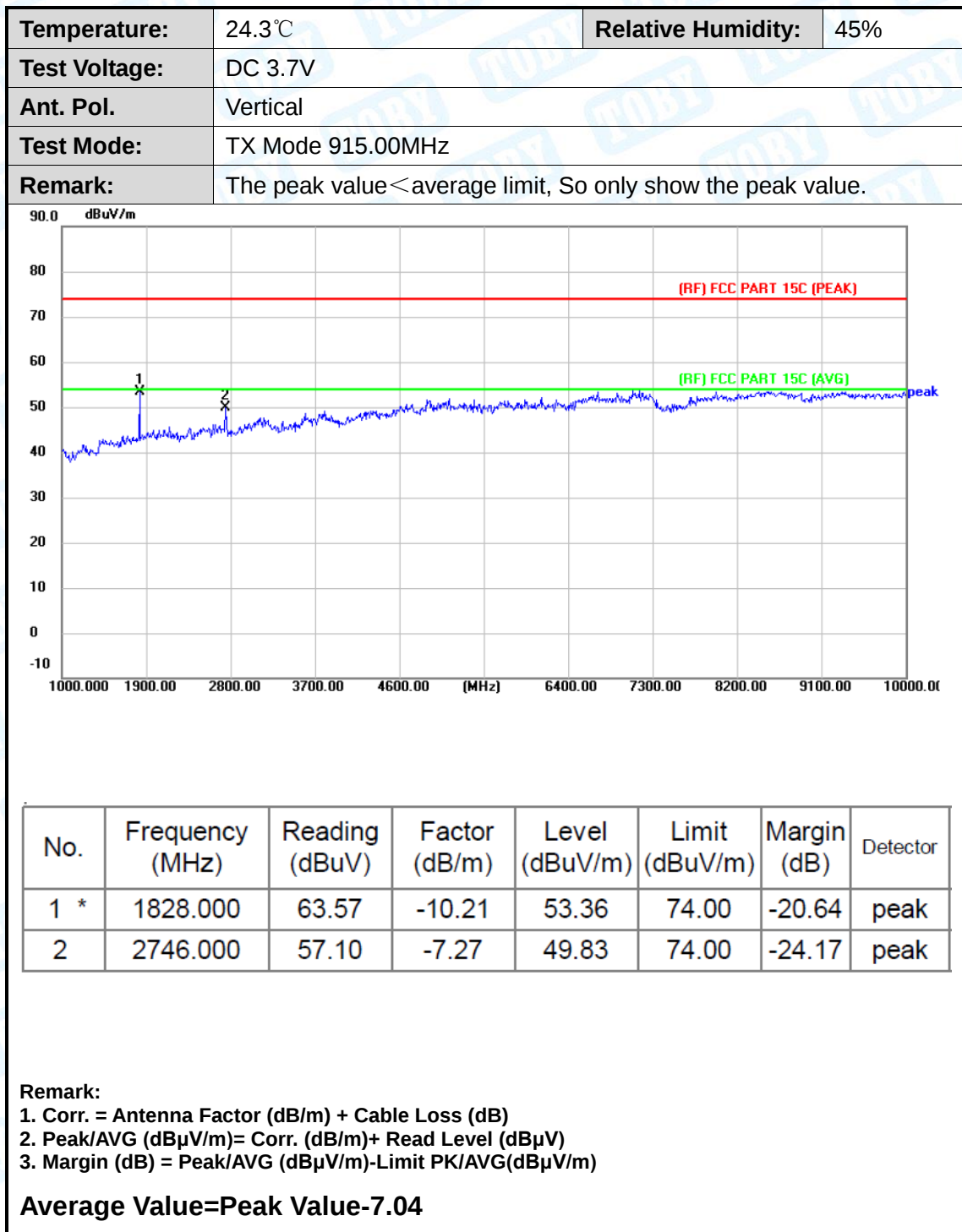


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	1828.000	63.72	-10.24	53.48	74.00	-20.52	peak
2	2746.000	57.37	-7.19	50.18	74.00	-23.82	peak

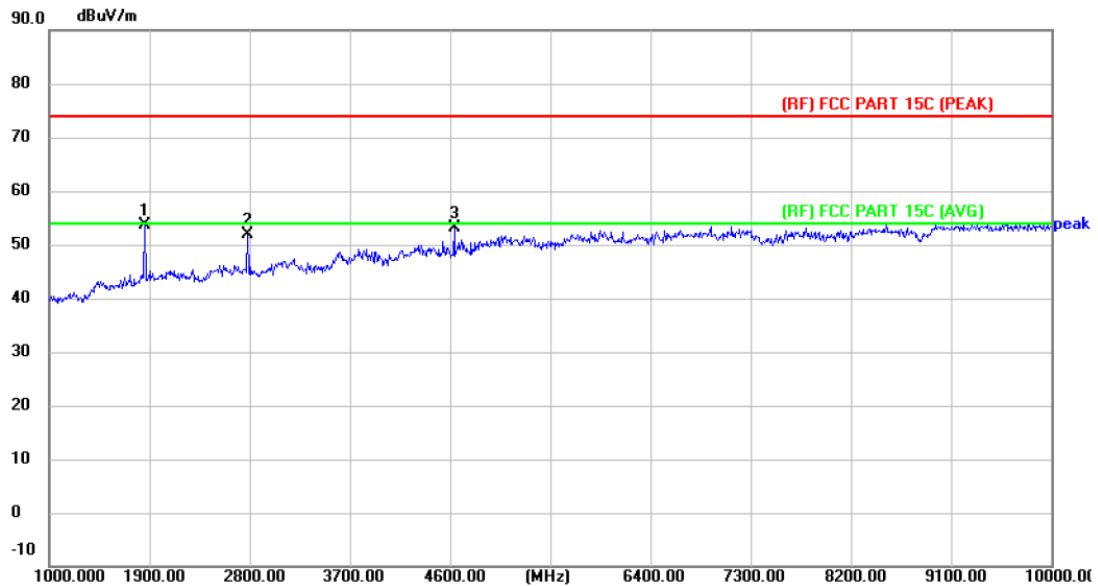
Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.04



Temperature:	24.3°C	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 926.50MHz		
Remark:	The peak value < average limit, So only show the peak value.		

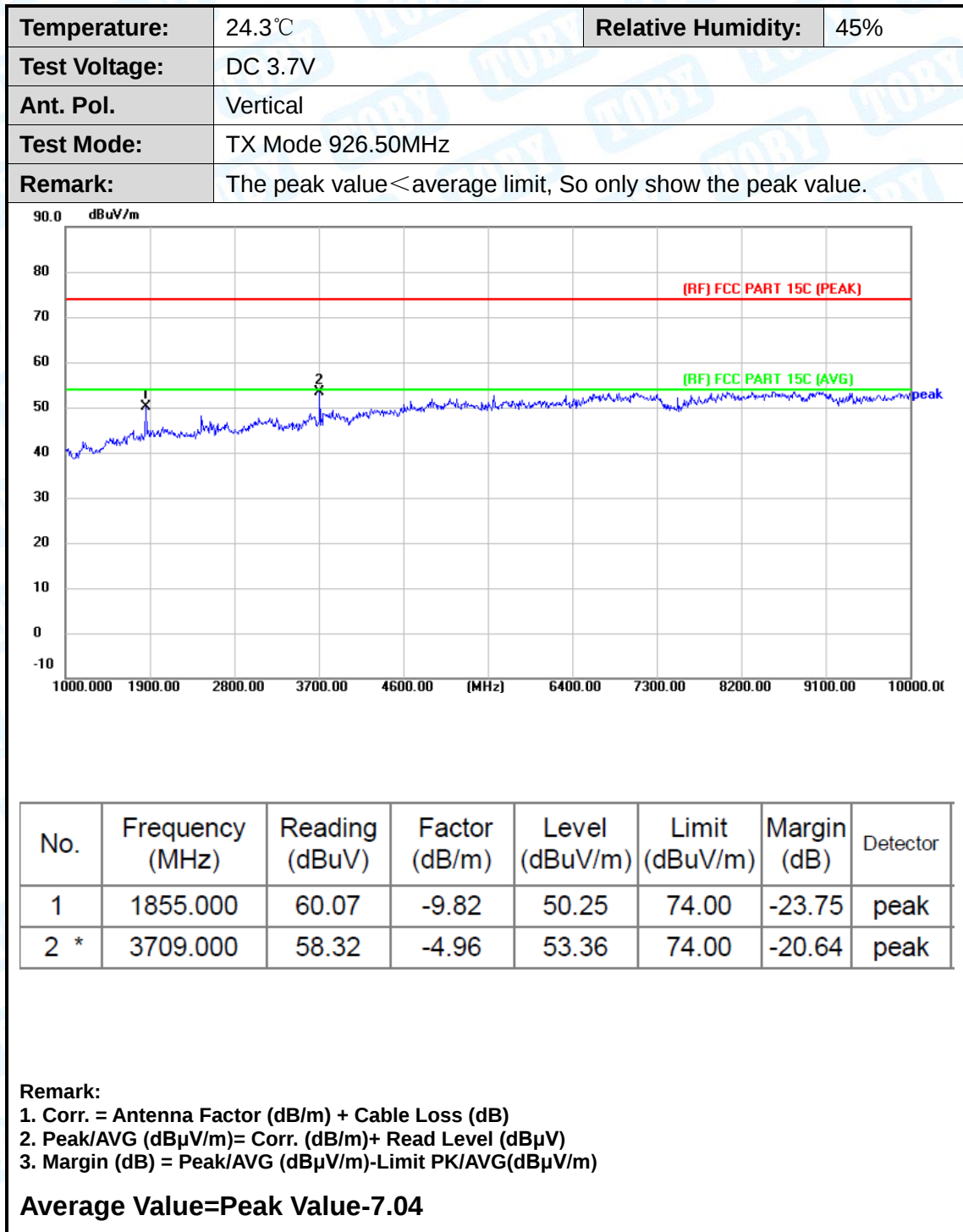


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	1855.000	63.71	-10.05	53.66	74.00	-20.34	peak
2	2782.000	59.25	-7.39	51.86	74.00	-22.14	peak
3	4636.000	55.63	-2.61	53.02	74.00	-20.98	peak

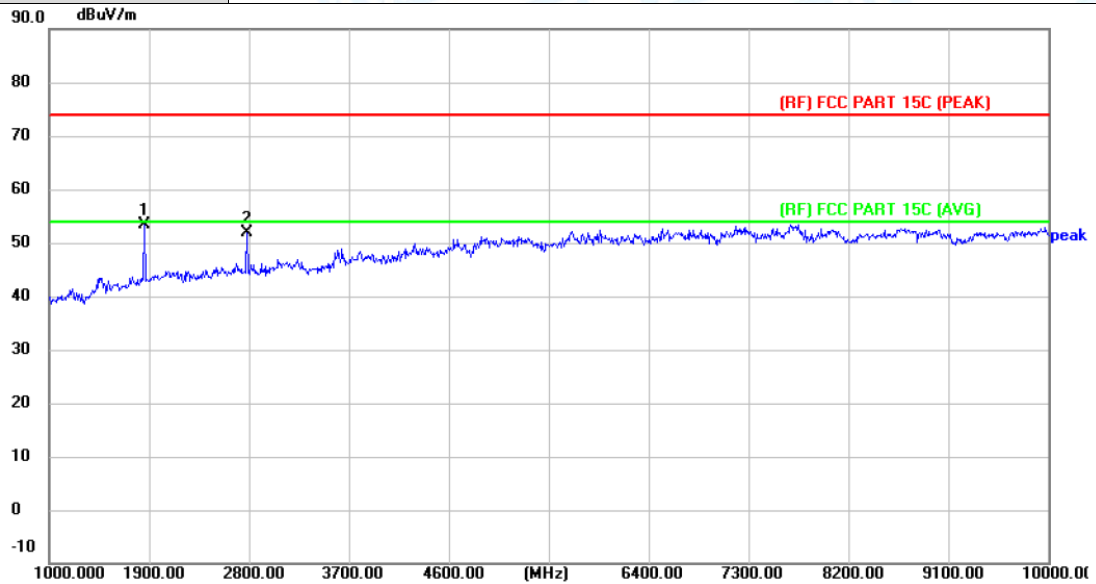
Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.04



Temperature:	24.3℃	Relative Humidity:	45%
Test Voltage:	DC 3.7V		
Ant. Pol.	Horizontal		
Test Mode:	TX Mode 927.95MHz		
Remark:	The peak value < average limit, So only show the peak value.		

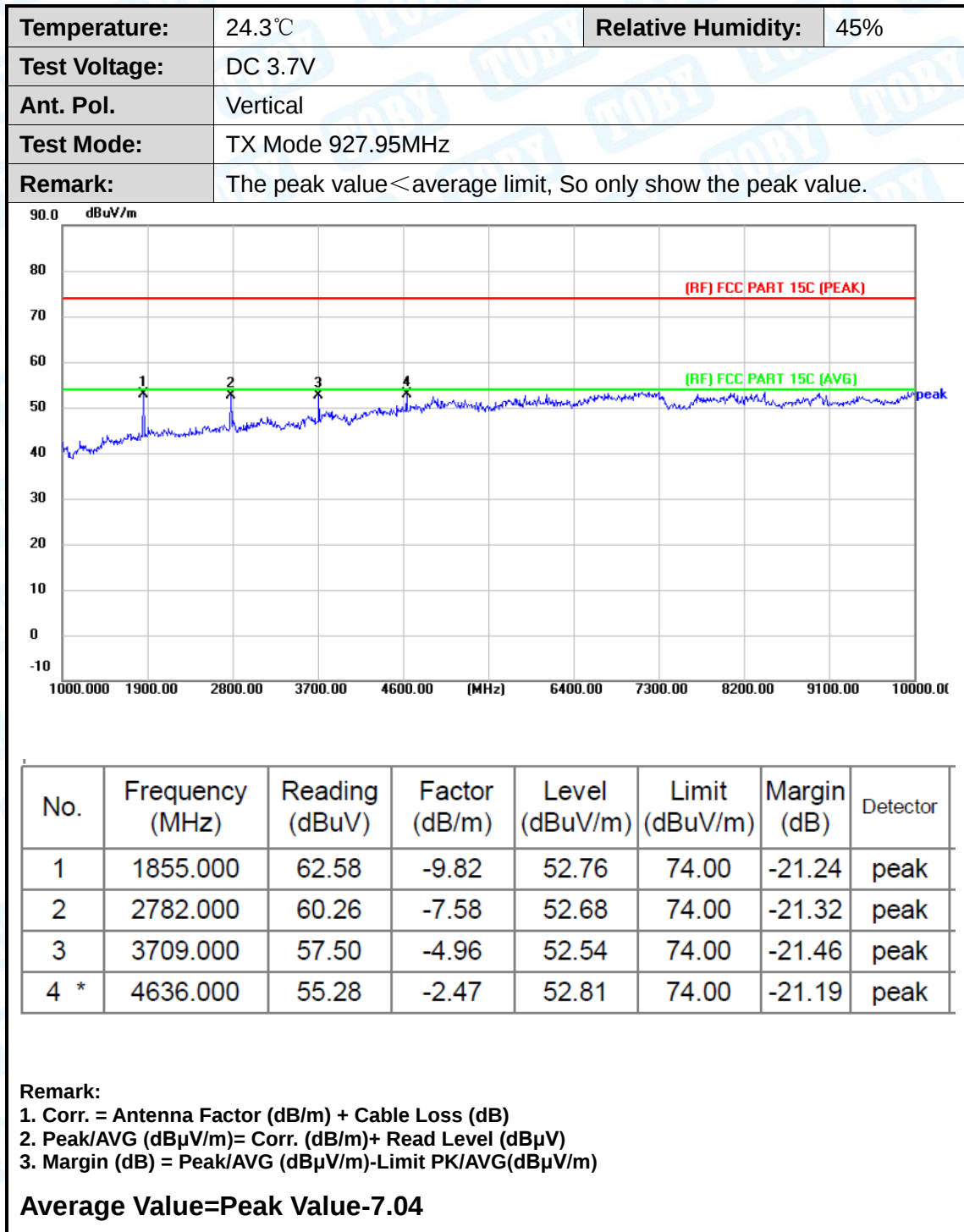


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	1855.000	63.33	-10.05	53.28	74.00	-20.72	peak
2	2782.000	59.22	-7.39	51.83	74.00	-22.17	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. Peak/AVG (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Peak/AVG (dBμV/m) - Limit PK/AVG (dBμV/m)

Average Value = Peak Value - 7.04



Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV. And AV is calculated by the following:
Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values.
Average Values=Peak Values+20log (Duty Cycle)
 - (2) Emission Level= Reading Level + Probe Factor +Cable Loss
 - (3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Pulse Desensitization Correction Factor

Note:

1)The Smallest Pulse Width (PW)= 0.325ms

(2) $2/PW=2/0.325(\text{ms})= 6.15\text{kHz}<100\text{ kHz}$

Because $2/PW<RBW$, so the PDCF is not needed.

Attachment C--Bandwidth Data

Temperature	:	24.6°C
Relative Humidity	:	45 %
Pressure	:	1010 hPa
Test Power	:	DC 3.7V

Frequency (MHz)	20 dBc Bandwidth (kHz)	99% OBW (kHz)	Limit (kHz)	Result
304.500	24.1660	8.551	761.250	PASS
313.250	24.6141	9.823		PASS
321.950	25.2896	10.283		PASS
433.075	26.0392	10.737	1082.69	PASS
433.825	24.8135	10.523		PASS
434.775	25.1986	10.437		PASS
915.000	22.7671	6.419	2287.50	PASS
926.500	28.8572	8.235		PASS
927.950	30.4507	8.113		PASS

304.500MHz

Agilent

Ch Freq 304.5 MHz Trig Free

Occupied Bandwidth

Span 100.000000 kHz

Ref 20 dBm Atten 30 dB

#Peak Log 10 dB/ Offst 0.5 dB

Center 304.5 MHz Span 100 kHz

#Res BW 1 kHz #VBW 3 kHz Sweep 103.6 ms (401 pts)

Occupied Bandwidth 24.1660 kHz

Occ BW % Pwr 99.00 %

x dB -20.00 dB

Transmit Freq Error 2.224 kHz

x dB Bandwidth 8.551 kHz

Span

Span 100.000000 kHz

Span Zoom

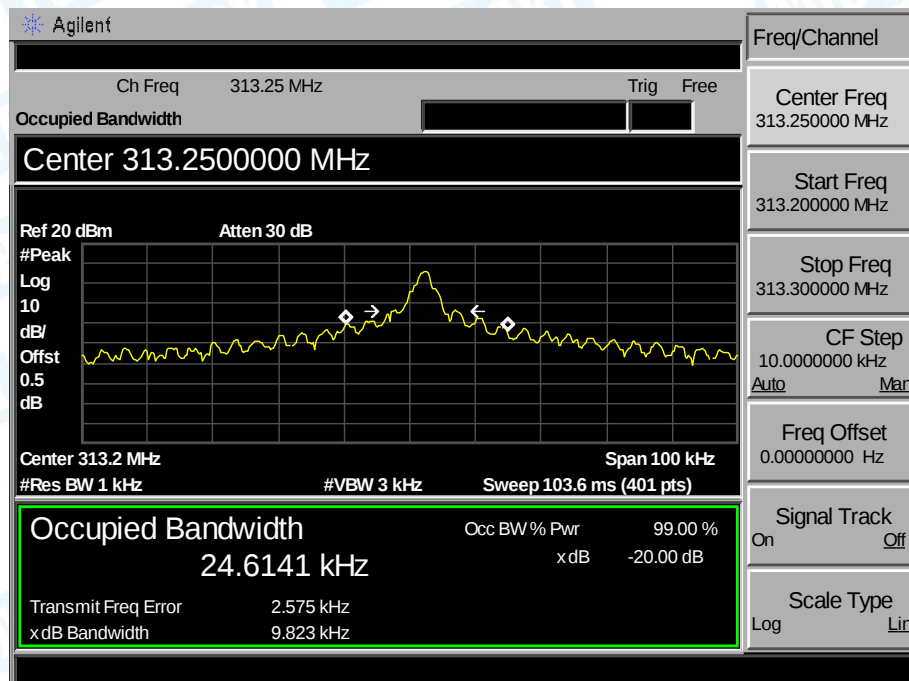
Full Span

Zero Span

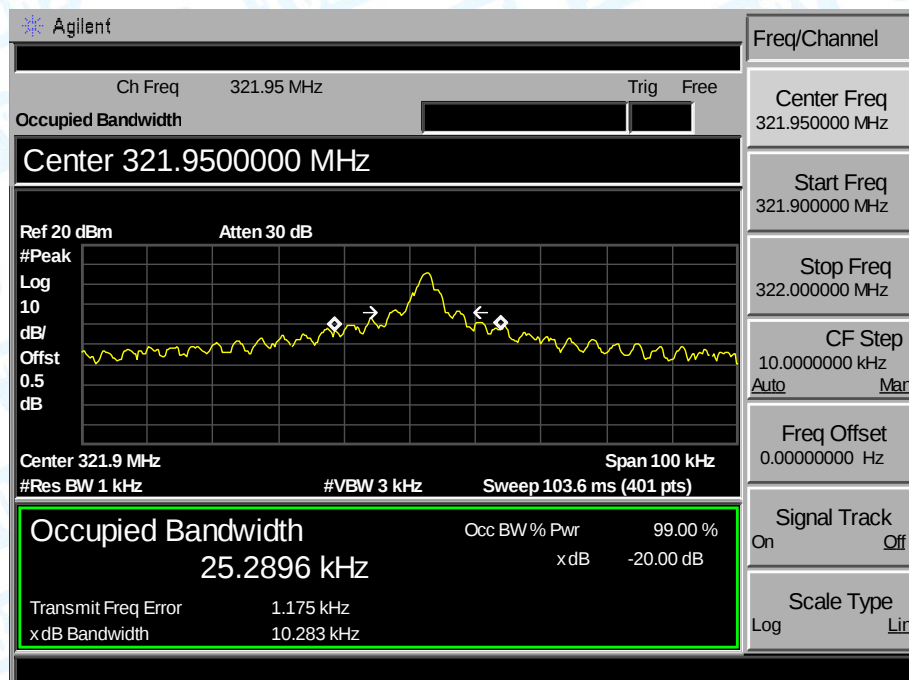
Last Span

Zone ▶

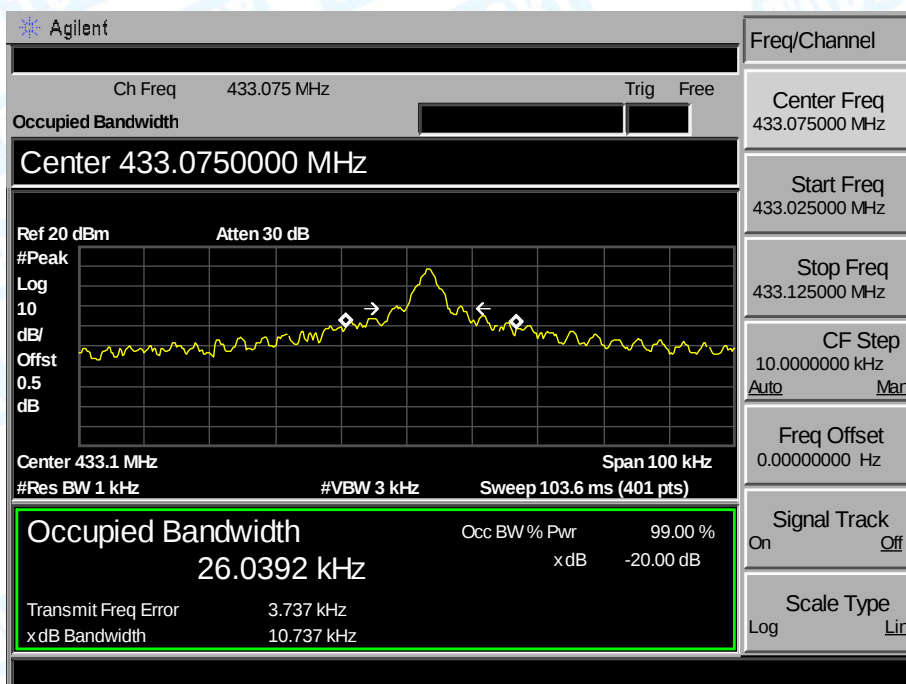
313.250MHz



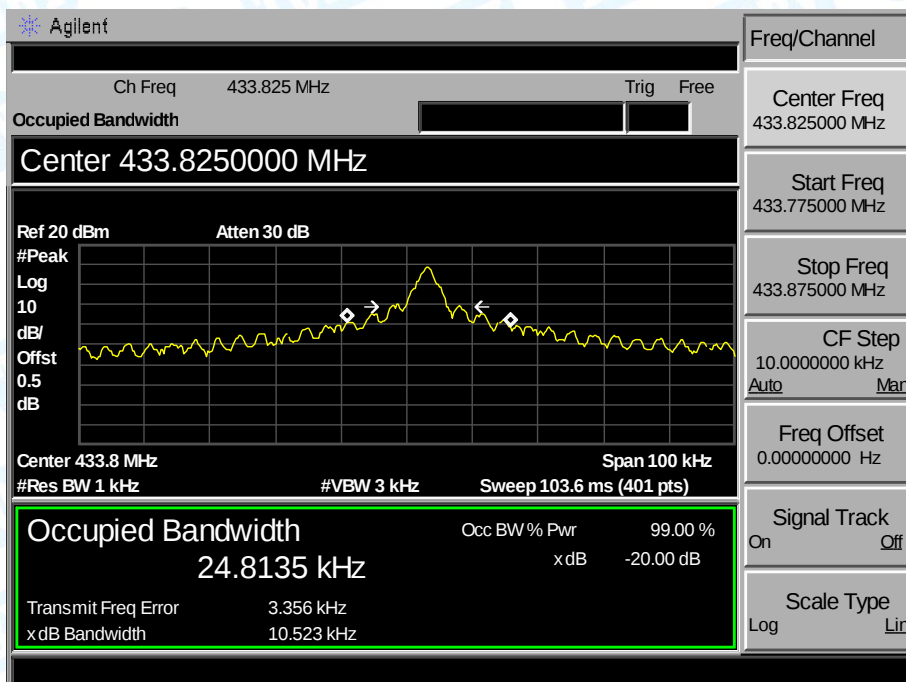
321.950MHz



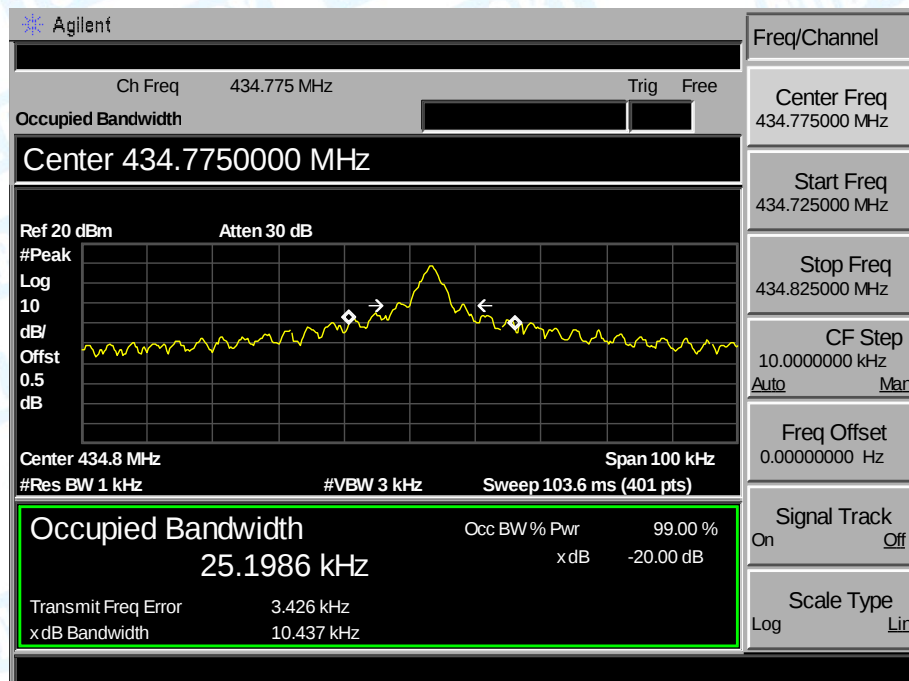
433.075MHz



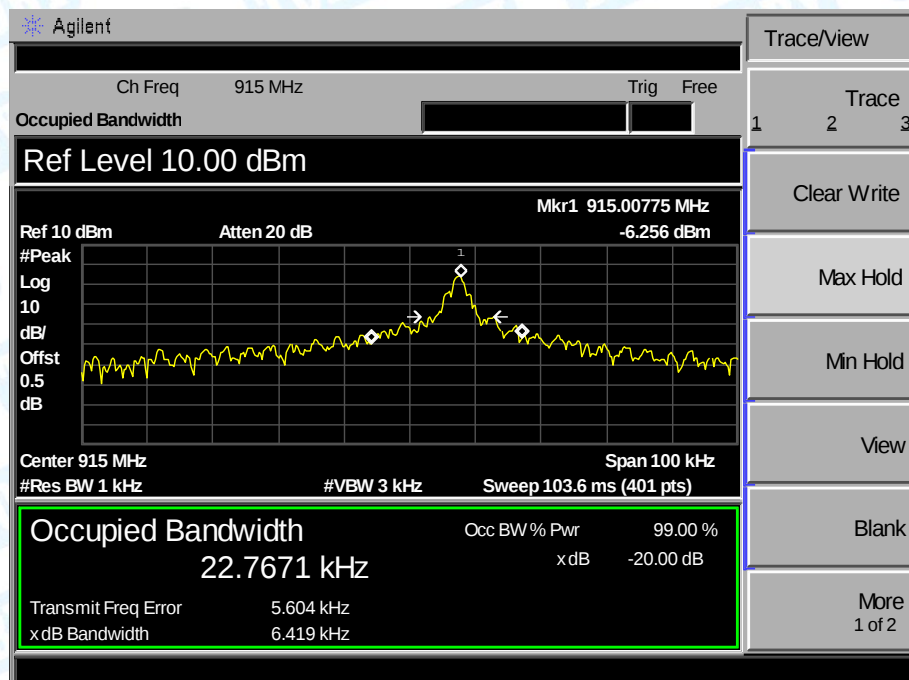
433.825MHz



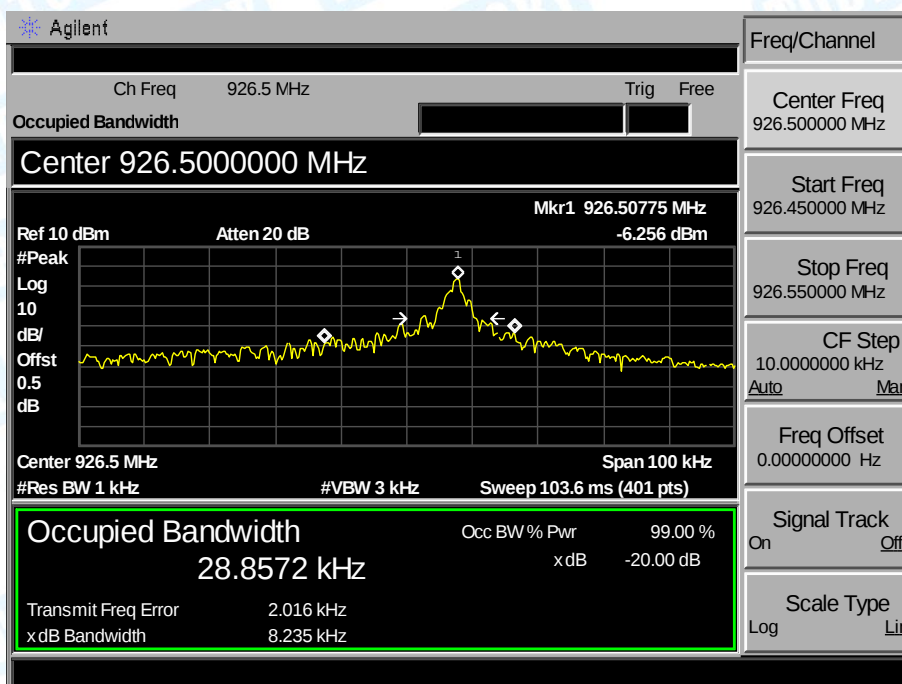
434.775MHz



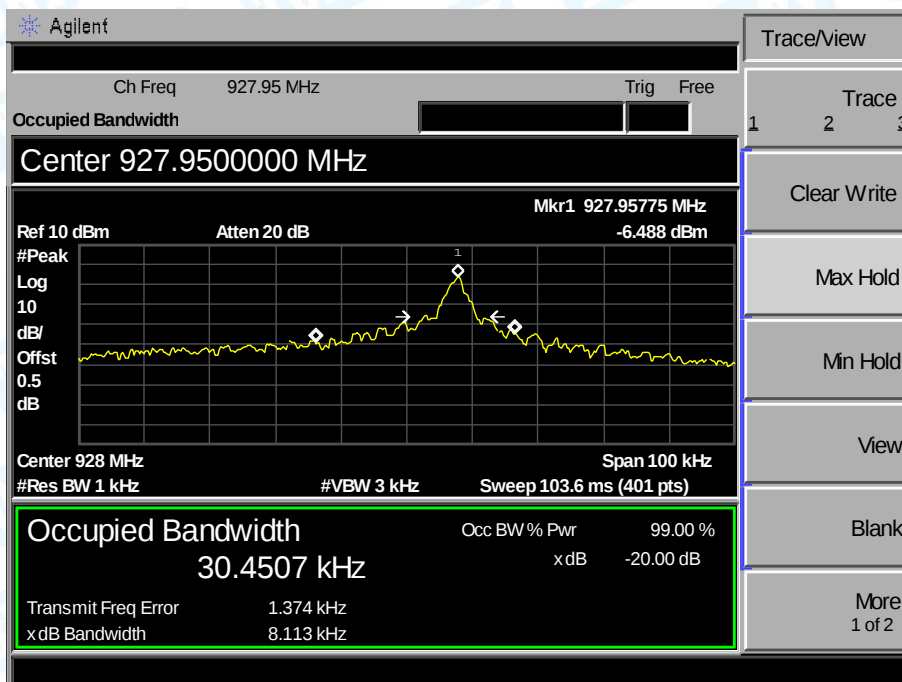
915.000MHz



926.500MHz



927.950MHz



Attachment D-- Release Time Measurement Data

Temperature	:	24.6℃	
Relative Humidity	:	45 %	
Pressure	:	1010 hPa	
Test Power	:	DC 3.7V	
Frequency (MHz)	Release Time(s)	Limit (s)	Result
304.500	0.225	5	PASS
313.250	0.2125	5	PASS
321.950	0.225	5	PASS
433.075	0.225	5	PASS
433.825	0.225	5	PASS
434.775	0.2125	5	PASS
915.000	0.225	5	PASS
926.500	0.225	5	PASS
927.950	0.225	5	PASS
304.500MHz			

Agilent

Ref 20 dBm
Peak
Log
10
dB/
Offst
0.5
dB

Mkr1 Δ 225 ms
0.007 dB

Atten 30 dB

Marker Δ
225.000000 ms
0.007 dB

W1 S2
S3 LS
AA

Center 304.5 MHz
Res BW 1 MHz

Span 0 Hz
VBW 1 MHz
Sweep 5 s (401 pts)

Marker

Select Marker
1 2 3 4

Normal

Delta

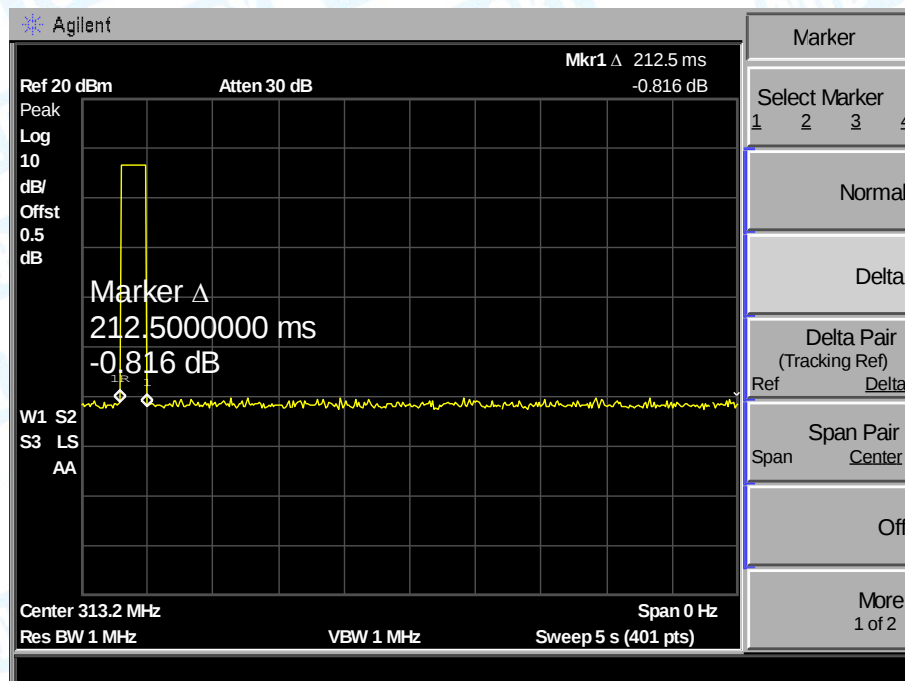
Delta Pair
(Tracking Ref)
Ref Delta

Span Pair
Span Center

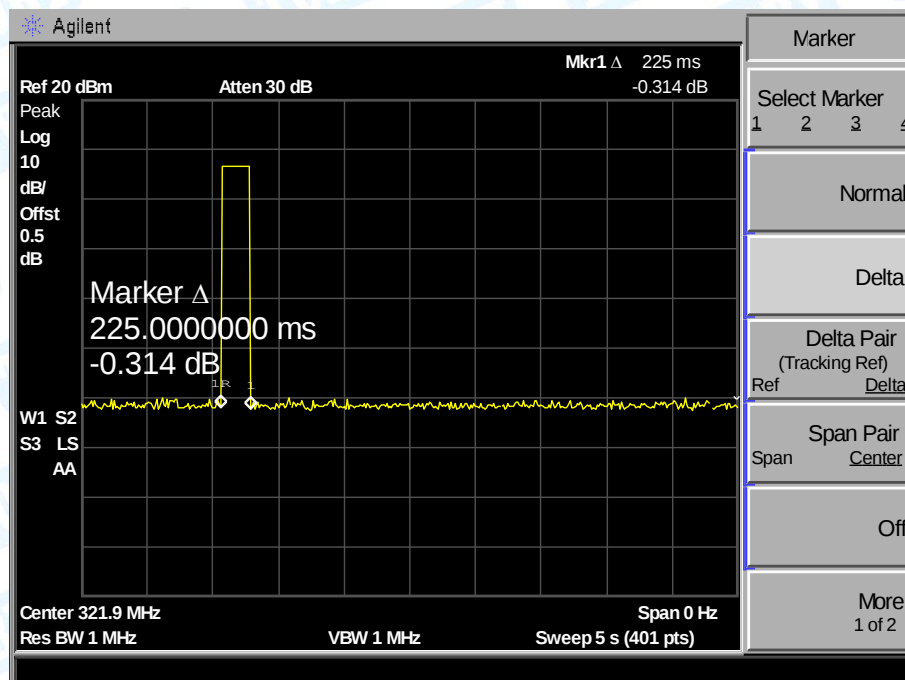
Off

More
1 of 2

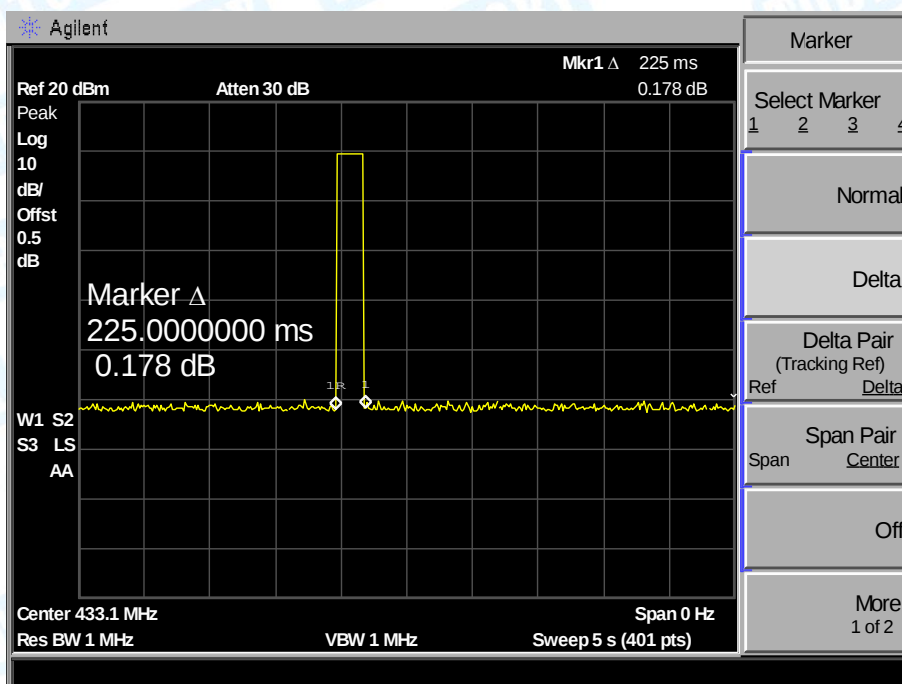
313.250MHz



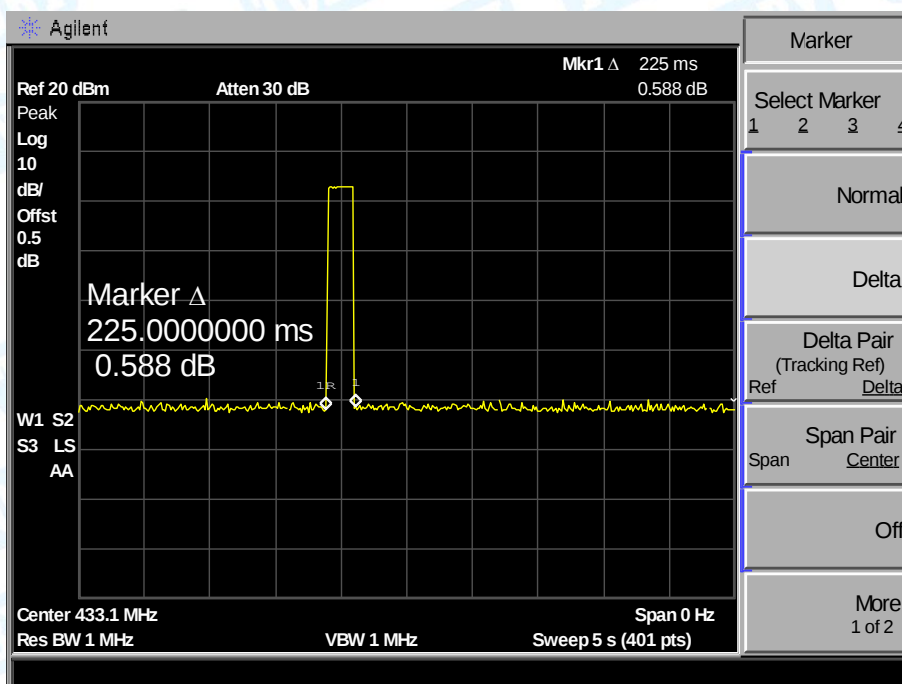
321.950MHz



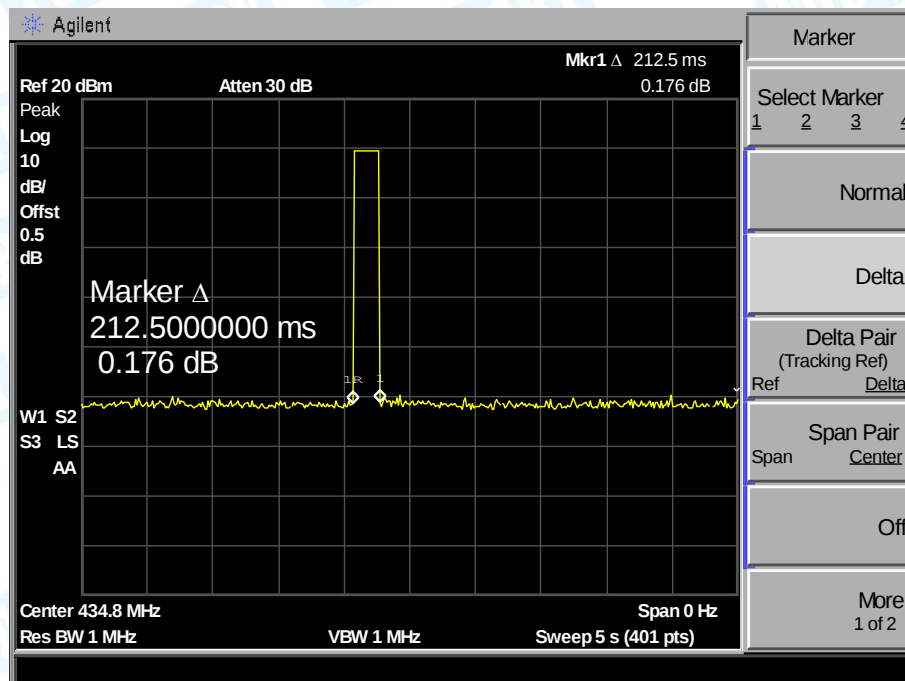
433.075MHz



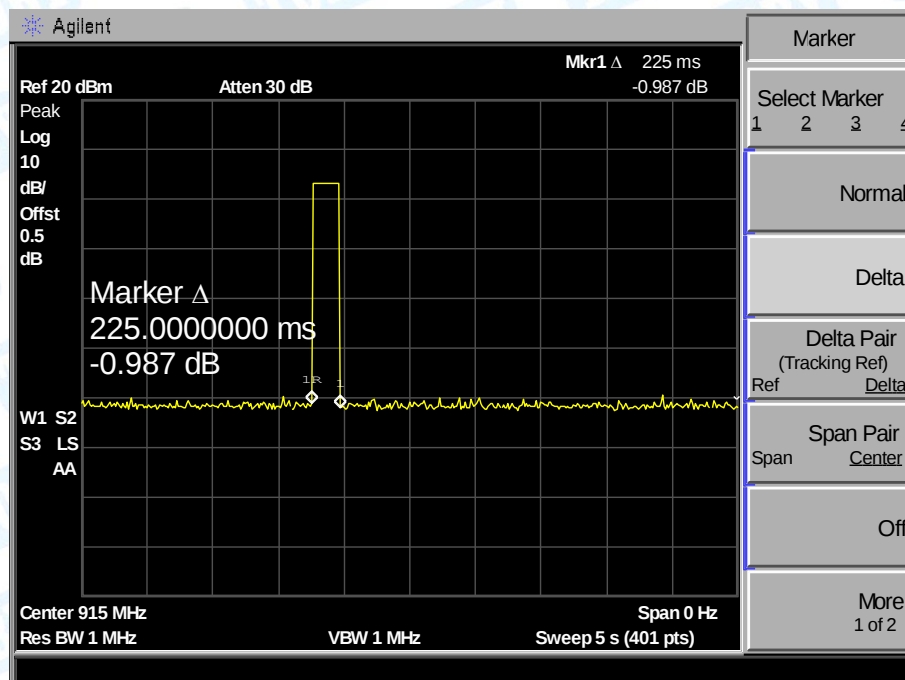
433.825MHz



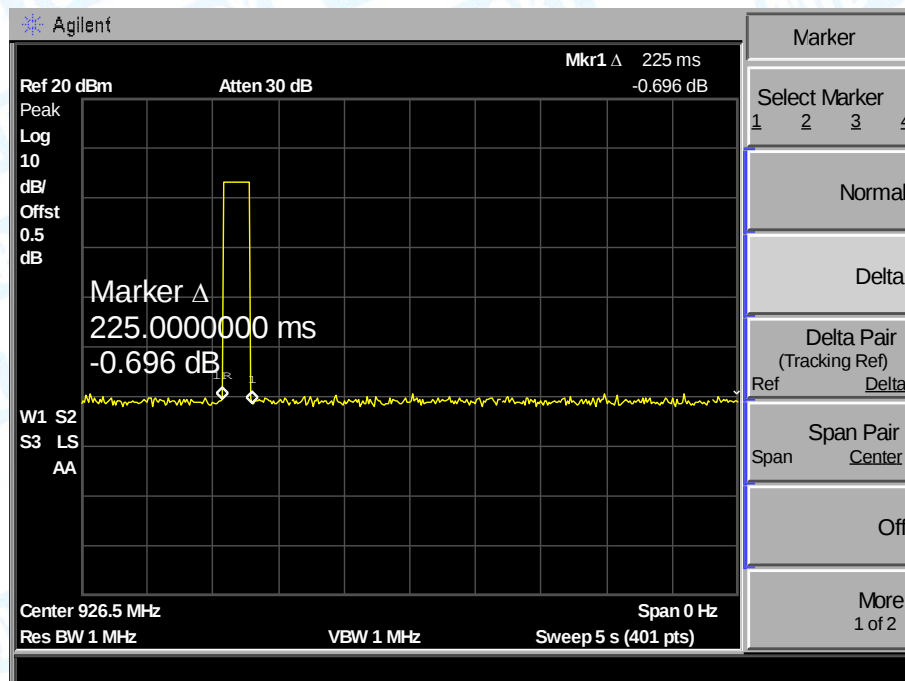
434.775MHz



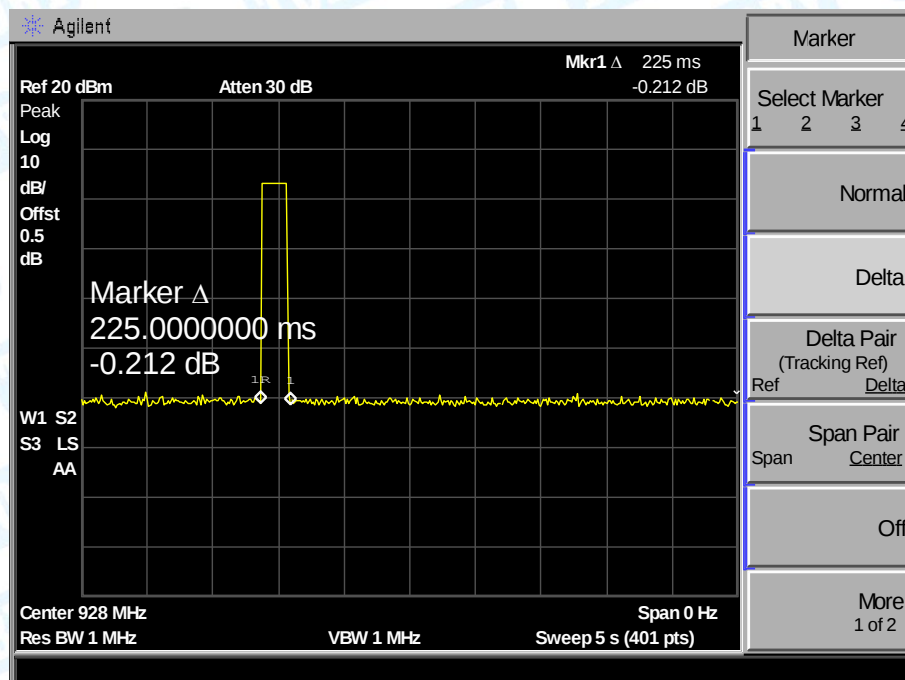
915.000MHz



926.500MHz



927.950MHz



Attachment E--Duty Cycle Data

Please refer the following pages:

----Range 1: 304.5-321.95MHz

Plot 1/Plot 2: transmit once in 100ms, and each cycle is 38.25 ms there are two kinds of pulse in each cycle, the large pulses total 14, the small pulses total 14.

Plot 3: one large pulse in a time period of 0.9125ms

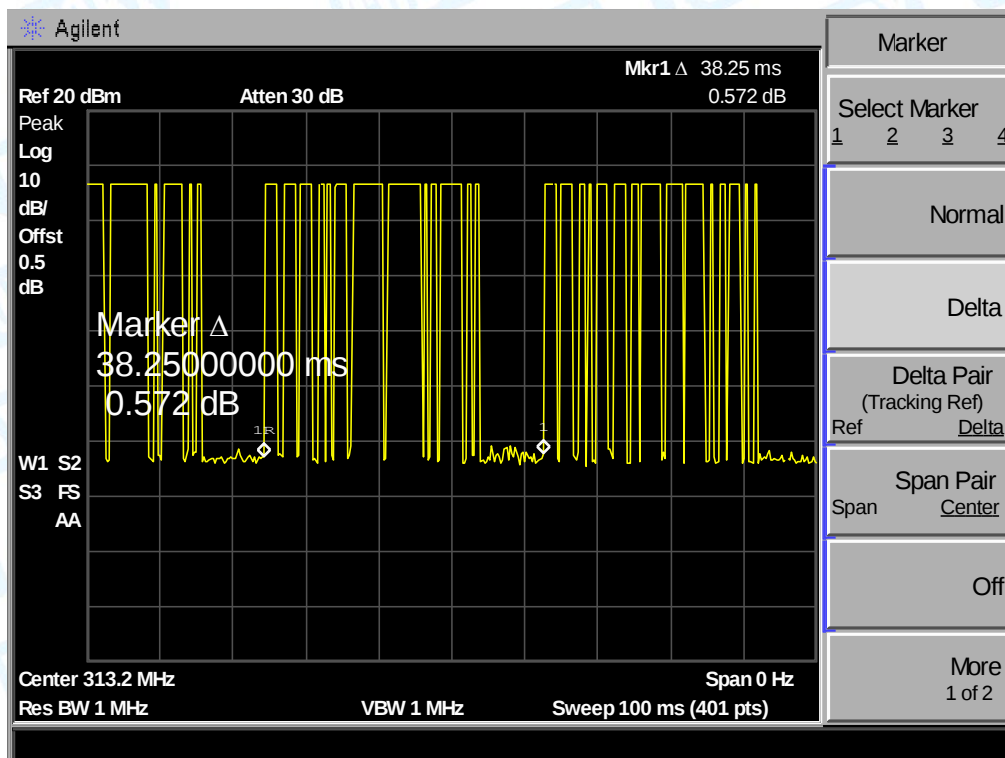
Plot 4: one middle pulse in a time period of 0.325ms

Duty Cycle=ON/Total= $(14 \times 0.9125 + 11 \times 0.325) / 38.25 = 16.35 / 3.775 = 42.75\%$

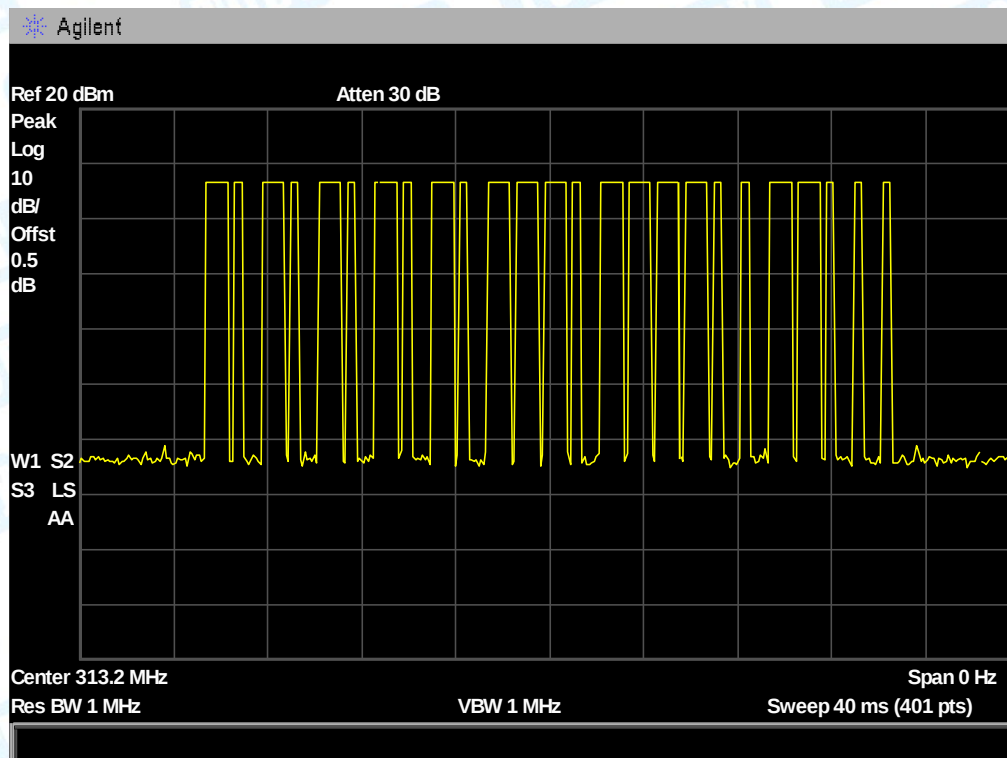
20 log(Duty Cycle)=-7.38

Average=Peak Value+ 20log(Duty Cycle), AV=PK-7.38

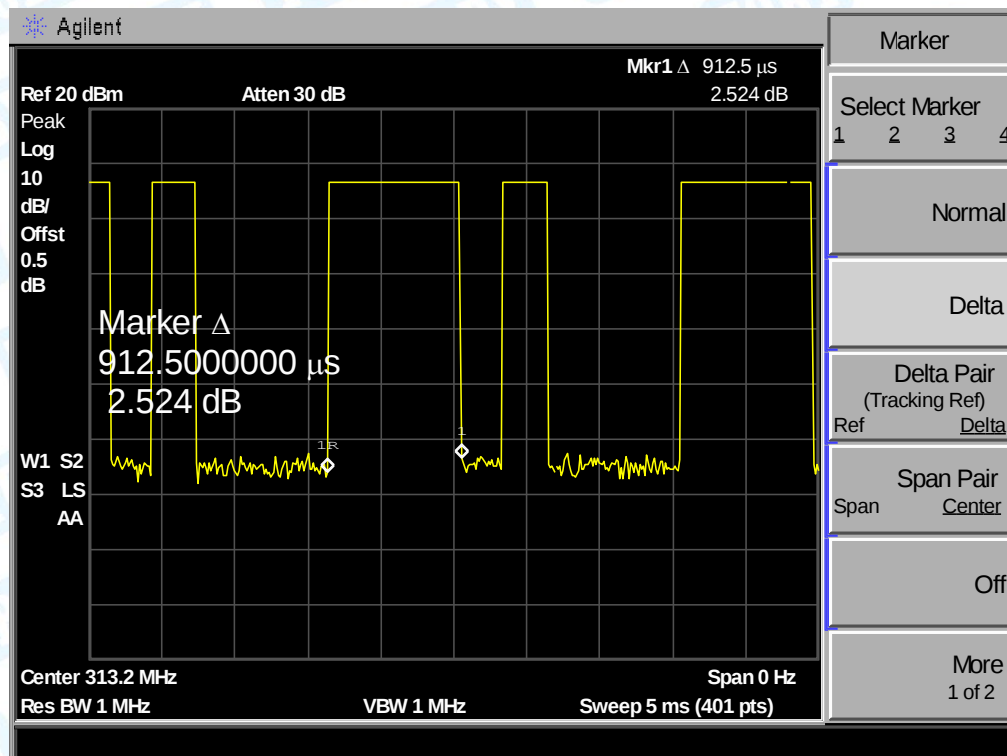
Plot 1



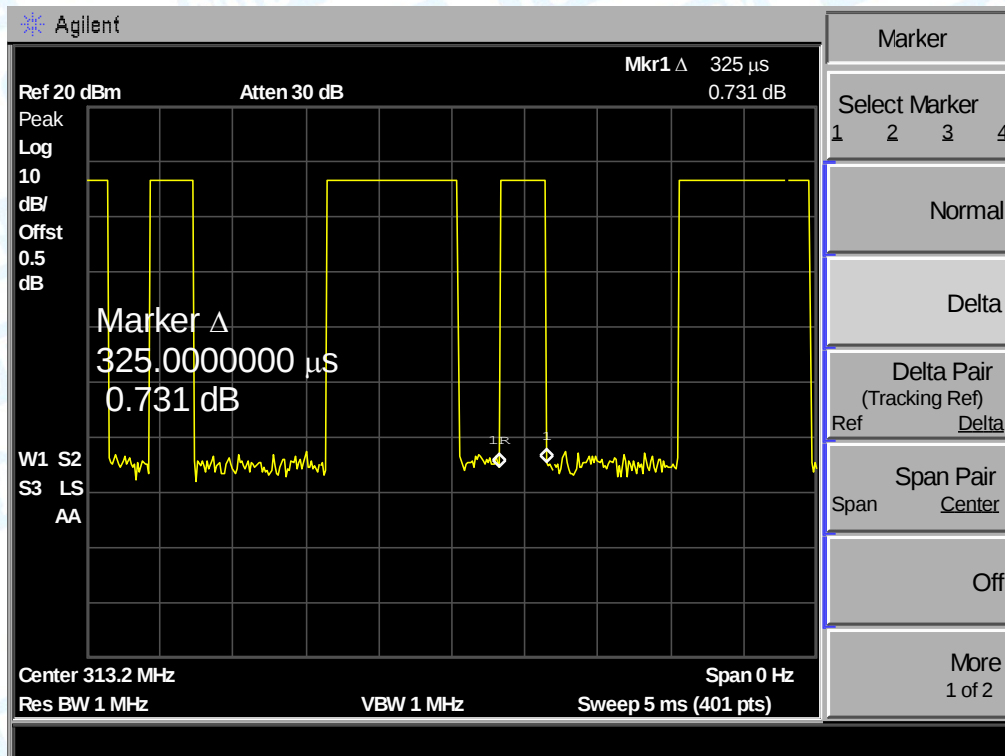
Plot 2



Plot 3



Plot 4



----Range 2: 433.075-434.775MHz

Plot 1/Plot 2: transmit once in 100ms, and each cycle is 38 ms there are two kinds of pulse in each cycle, the large pulses total 14, the small pulses total 14.

Plot 3: one large pulse in a time period of 0.950ms

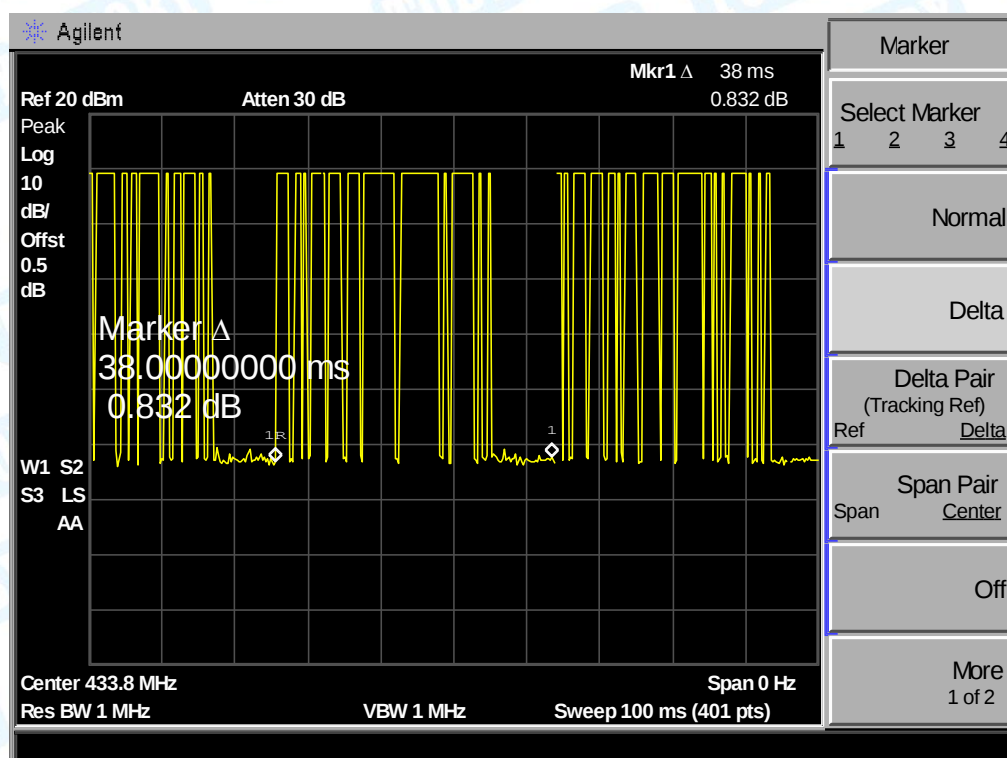
Plot 4: one middle pulse in a time period of 0.325ms

Duty Cycle=ON/Total=(14*0.950+11*0.325)/38=16.875/38=44.41%

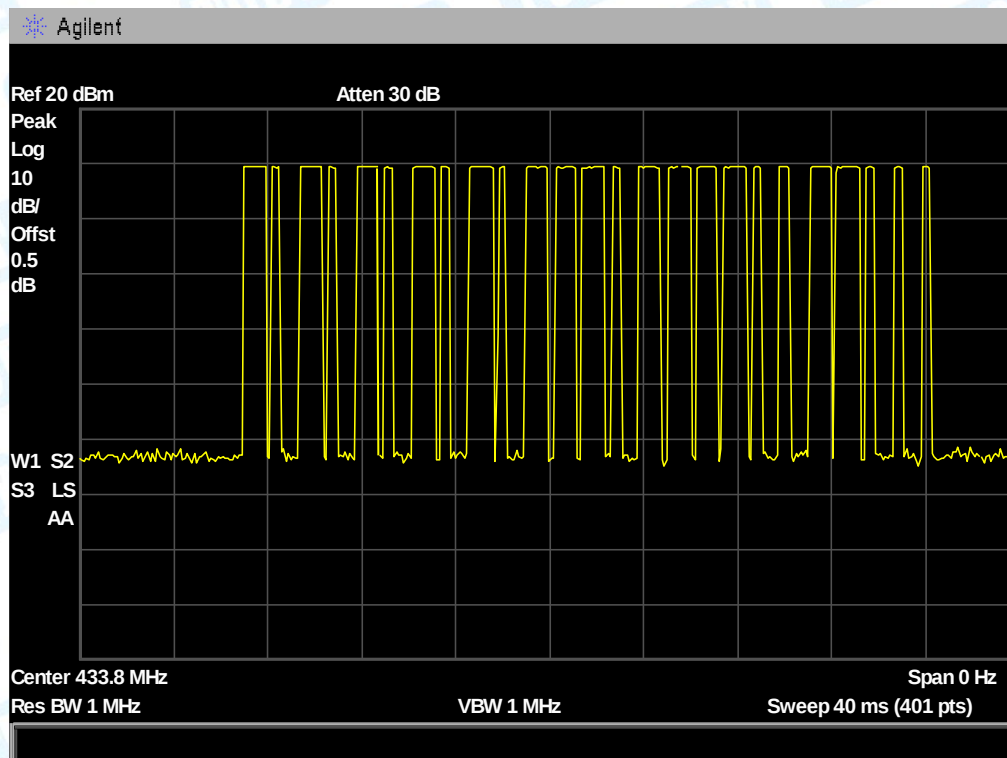
20 log(Duty Cycle)=-7.05

Average=Peak Value+ 20log(Duty Cycle), AV=PK-7.05

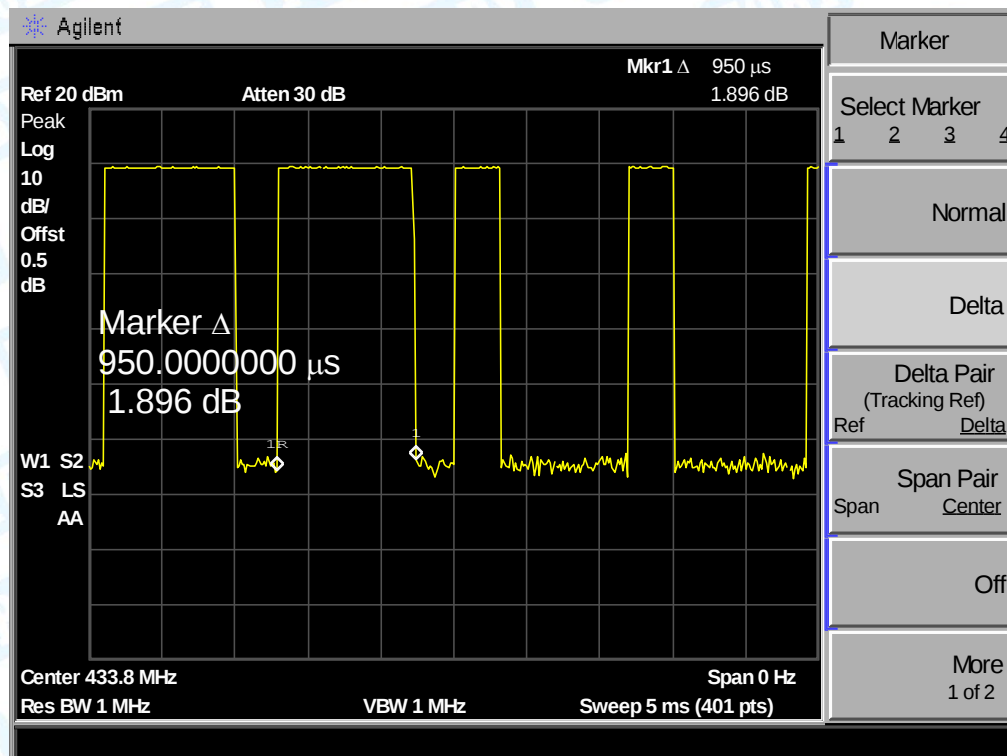
Plot 1



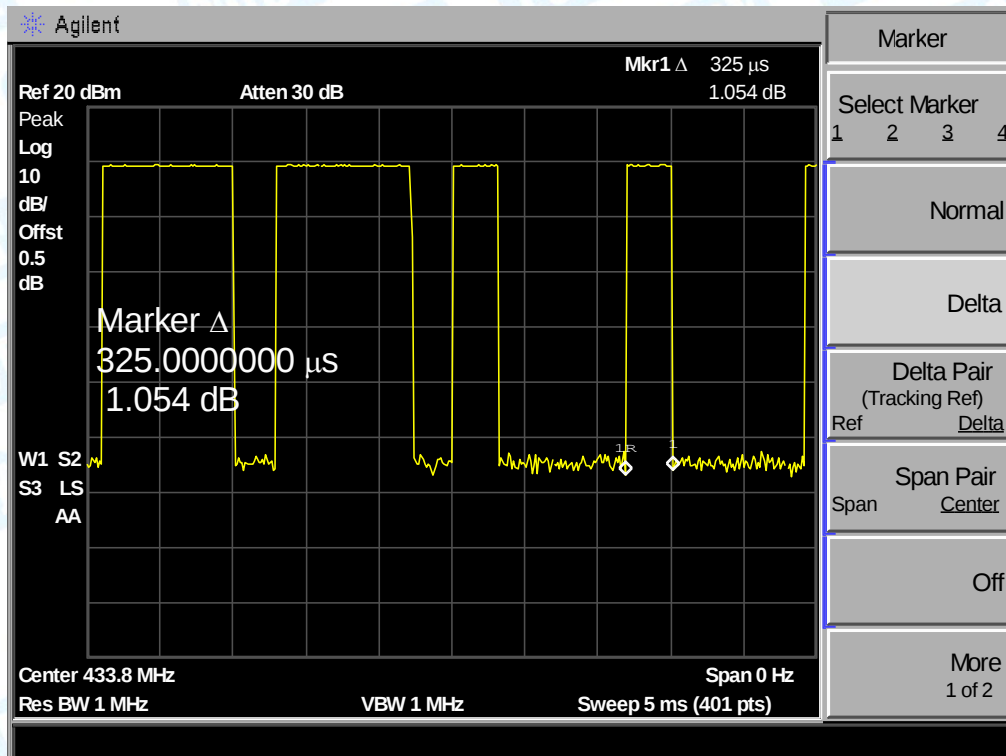
Plot 2



Plot 3



Plot 4



----Range 4: 915.00-927.95MHz

Plot 1/Plot 2: transmit once in 100ms, and each cycle is 38ms there are two kinds of pulse in each cycle, the large pulses total 14, the small pulses total 11.

Plot 3: one large pulse in a time period of 0.9125ms

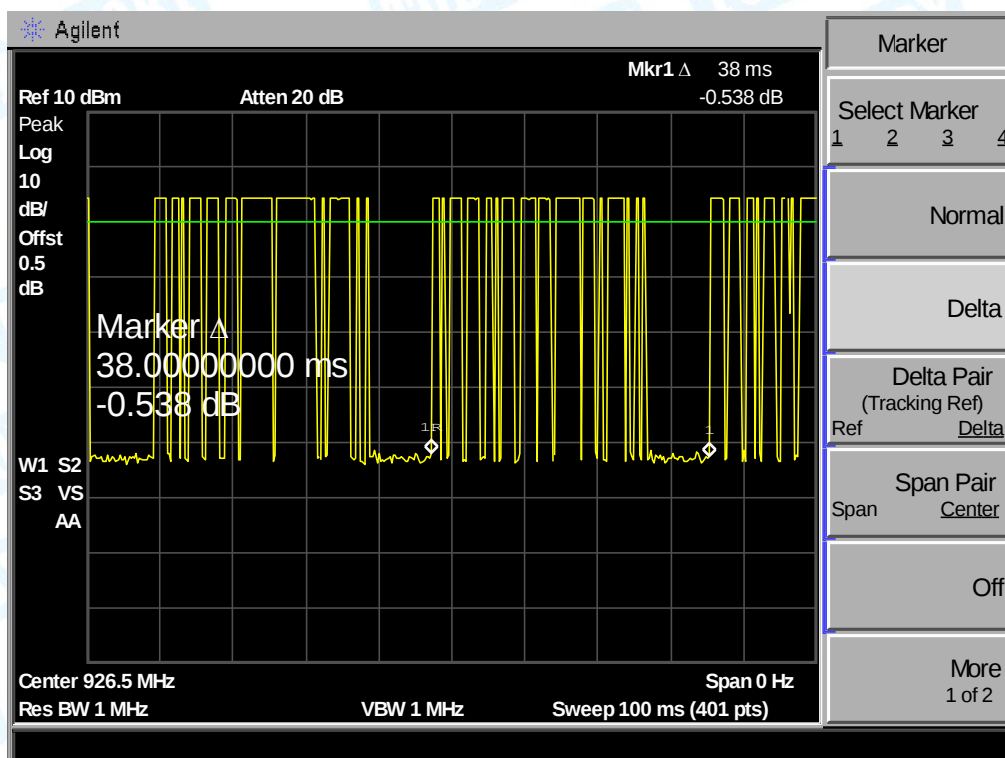
Plot 4: one middle pulse in a time period of 0.375ms

$$\text{Duty Cycle} = \text{ON/Total} = (14 \times 0.9125 + 11 \times 0.375) / 38 = 16.9 / 38 = 44.47\%$$

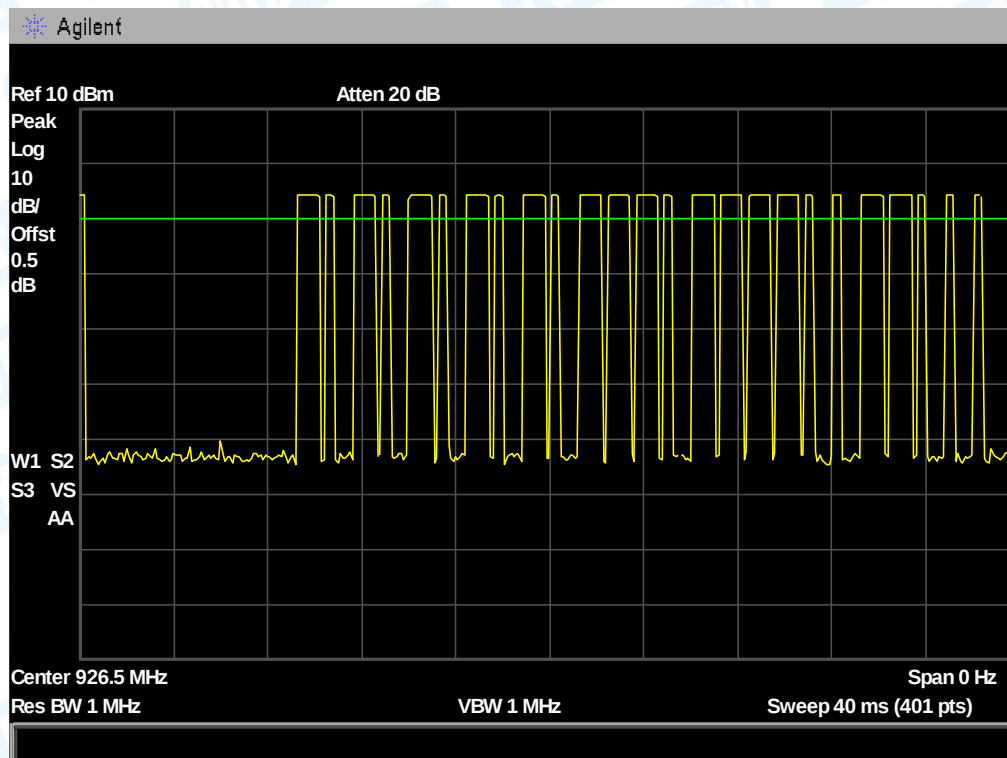
$$20 \log(\text{Duty Cycle}) = -7.04$$

$$\text{Average} = \text{Peak Value} + 20 \log(\text{Duty Cycle}), \text{AV} = \text{PK} - 7.04$$

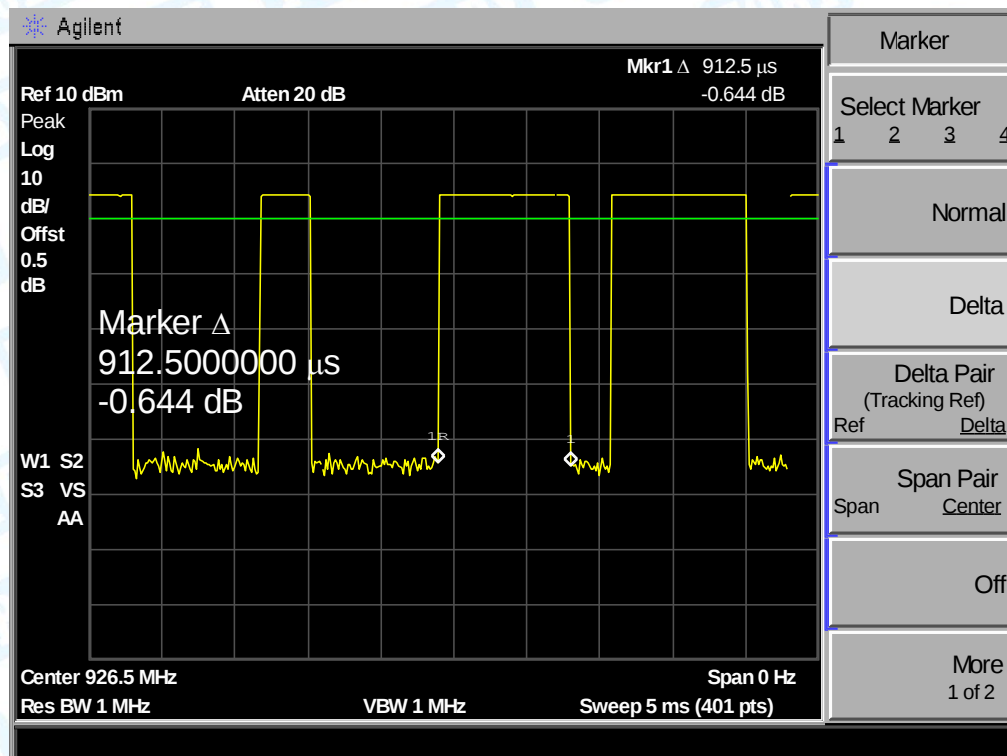
Plot 1



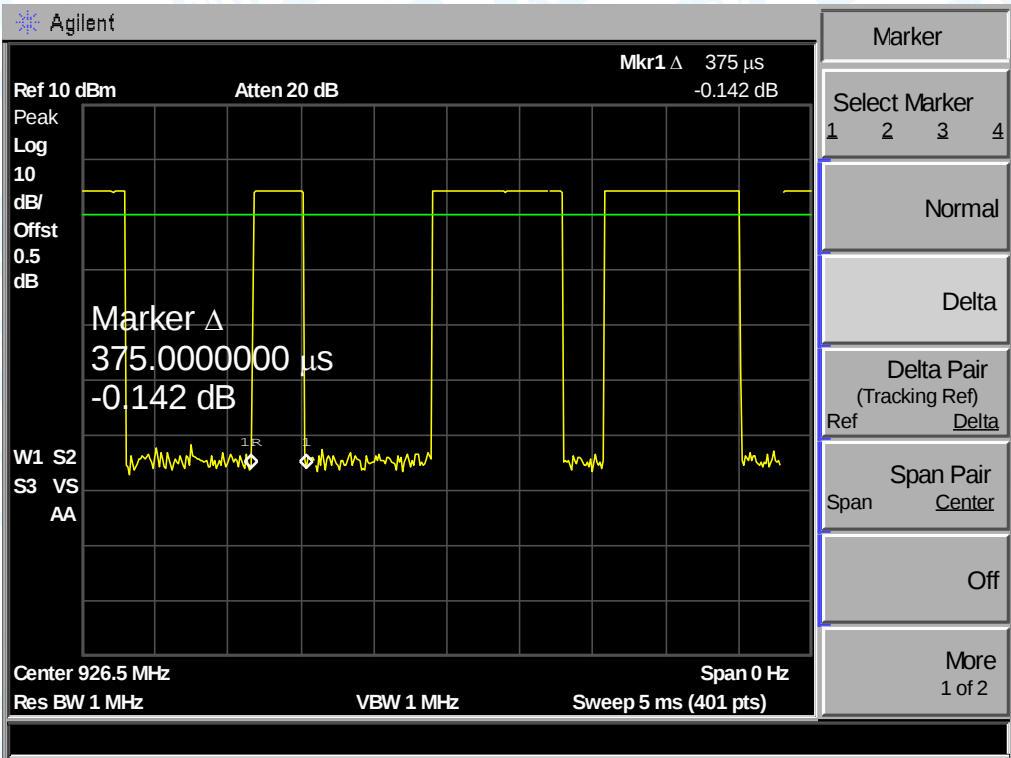
Plot 2



Plot 3



Plot 4



-----END OF REPORT-----