

FCC ID TEST REPORT

Prepared for.....:	GUANGZHOU TAIMA(TICODE) ELECTRONICS TECHNOLOGY LTD.
Address.....:	NO.768, Shenzhou Road, Science City, Luogang, Guangzhou, China
Equipment Under Test(E.U.T.):	Wireless Barcode Scanner
Model.....:	TS4500H
FCC ID.....:	2AET8TS4500HA
Applicable Standards.....:	FCC Part 15:2013 Subpart C, Paragraph 15.231
Test Date.....:	05 June 2015 to 12 June 2015
Issued Date.....:	15 June 2015
Report Number.....:	POCE15042932SRF1
Test Engineer.....:	<i>Bin Jiang</i>
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1.0 General Information

1.1 Client details

Applicant:	GUANGZHOU TAIMA(TICODE) ELECTRONICS TECHNOLOGY LTD.
Address:	NO.768, Shenzhou Road, Science City, Luogang, Guangzhou, China
Manufacturer:	GUANGZHOU TAIMA(TICODE) ELECTRONICS TECHNOLOGY LTD.
Address:	NO.768, Shenzhou Road, Science City, Luogang, Guangzhou, China

1.2 Test lab details

Name :	Shenzhen POCE Technology Co.,Ltd.
Address:	Room 502, Bldg. 1, Xinghua Garden, Baoan Road Xixiang, Baoan District, Shenzhen, China
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Site Listed with Federal Communication Commission

Registration Number: 222278

For 3m chamber

1.3 Description of E.U.T.

Product:	Wireless Barcode Scanner
Model No.:	TS4500H
Additional Model No.:	TS4500, TS4508, TS4508H
Brand Name	钛码/TICODE
Operation Frequency:	460 MHz-469.5 MHz
Operation channel:	96
Channel Spacing:	0.1 MHz
Modulation Type:	GFSK
Antenna Designation:	An integral antenna and the maximum antenna gain is 2dBi.
Rating:	DC 3.7V via Battery or DC 4.2V from designated socket
Remark:	TS4500, TS4500H, TS4508, TS4508H have the same sofeware and electrical construction. The differences between TS4500(H) and TS4508 is focal point of scan light. The differences between TS4500(H) and TS4508(H) is package of produce.

1.4 AE used during the test

Equipment type	Model	Manufacturer	FCC Approval
N.A.			
N.A.			
N.A.			

2.0 Test summary

Section in CFR 47	Test Item	Result
15.207(a)	AC Power Line Conducted Emission	Complies
15.231(e), 15.205, 15.209, 15.35	Radiation Emission	Complies
15.231(c)	Occupied Bandwidth	Complies

3.0 E.U.T. modification

No modification by Shenzhen POCE Technology Co., Ltd

4.0 Measurement Uncertainty

(95% confidence levels, k=2)

No.	Item	MU
1.	Radio Frequency	$\pm 1 \times 10^{-9}$
2.	Temperature	$\pm 0.1^{\circ}\text{C}$
3.	Humidity	$\pm 1.0\%$
4.	RF power, conducted	$\pm 0.34\text{dB}$
5.	Spurious emissions, conducted	$\pm 2.72\text{dB}$
6.	All emissions, radiated	$\pm 3.84\text{dB}$

5.0 Power Line Conducted Emission Test

5.1 Test equipment

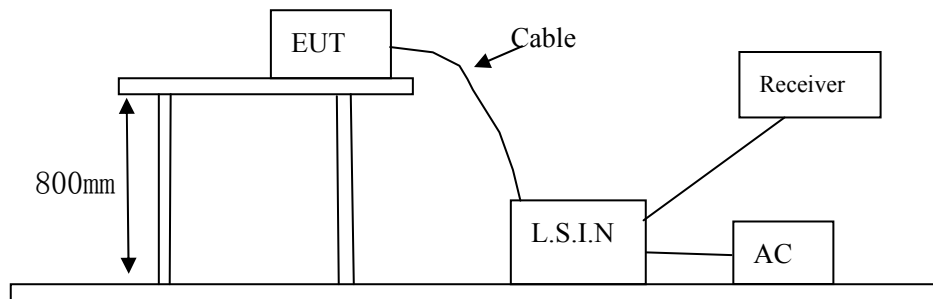
Instrument Type	Model	Serial No.	Manufacturer	Date of Cal.	Due Date
EMI Test Receiver	ESCI	1166.590.03	R&S	Nov. 09, 2014	Nov. 08, 2015
LISN	ESH3-Z5	831.5518.52	R&S	Nov. 09, 2014	Nov. 08, 2015

5.2 Test method and test procedure

The E.U.T. was tested according to ANSI C63.10-2009. The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

5.3 Block diagram of test setup



5.4 E.U.T. operating condition

Operating condition is according to ANSI C63.10 -2009

- 1) Setup the E.U.T. and simulators as shown on the following
- 2) Enable AF signal and confirm E.U.T. active to normal condition

5.5 Power line conducted emission limit according to paragraph 15.207

Frequency(MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes: 1) *Decreasing linearly with logarithm of frequency.

- 2) The tighter limit shall apply at the transition frequencies

5.6 Test specification

Environmental conditions: Temperature: 25° C Humidity: 50% Atmospheric pressure: 103kPa

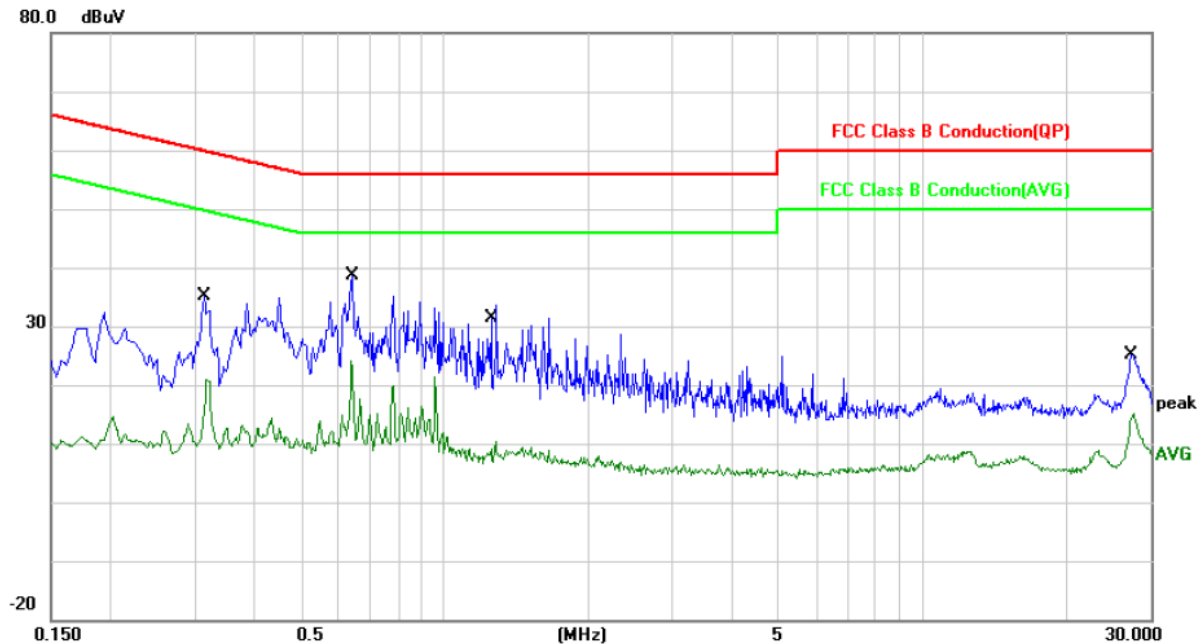
5.7 Test result

Pass.

Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

E.U.T. Description:	Wireless Barcode Scanner
Operation Mode:	Tx mode
Tested By:	Bill
Test date:	08 June 2015

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s

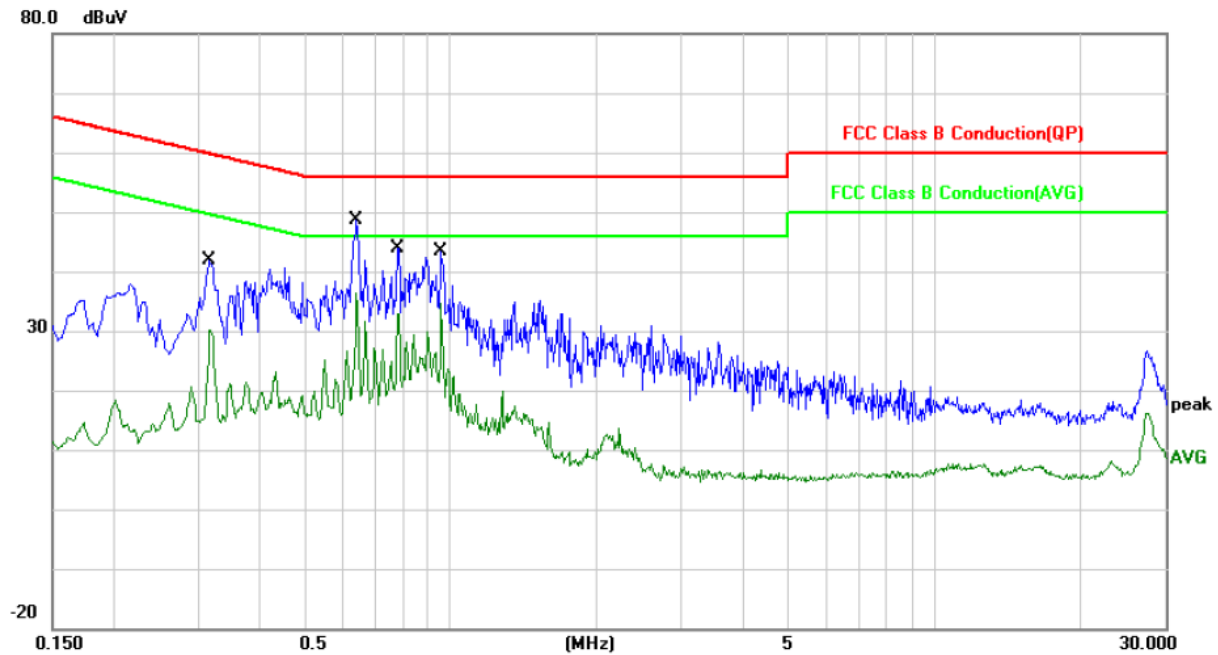


Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral		Quasi-peak Average	
	Quasi-peak	Average	Quasi-peak	Average		
0.3173	29.23	20.60	--	--	59.78	49.78
0.6332	30.75	19.08	--	--	56.00	46.00
1.2622	16.68	7.27	--	--	56.00	46.00
27.3074	19.06	13.65	--	--	60.00	50.00
			--	--		
			--	--		

Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

E.U.T. Description:	Wireless Barcode Scanner
Operation Mode:	Tx mode
Tested By:	Bill
Test Data:	08 June 2015

Start Frequency	Stop Frequency	Step	IF BW	Detector	Final M-Time
0.15MHz	30MHz	4.5KHz	10KHz	QP+AV	1s



Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral		Quasi-peak	Average
	Quasi-peak	Average	Quasi-peak	Average		
0.3194	--	--	39.64	30.37	59.72	49.72
0.6376	--	--	47.04	36.66	56.00	46.00
0.7795	--	--	43.35	33.73	56.00	46.00
0.9558	--	--	41.26	33.10	56.00	46.00
	--	--				
	--	--				

6.0 Radiated Spurious Emission Test

6.1 Test equipment

Instrument Type	Model	Serial No.	Manufacturer	Date of Cal.	Due Date
ESPI Test Receiver	ESPI 3	100379	R&S	Nov. 09, 2014	Nov. 08, 2015
Spectrum Analyzer	E4408B	MY41440717	Agilent	Jan. 13, 2015	Jan. 12, 2016
Pre-amplifier	LNA6900	--	Teseq	Nov. 09, 2014	Nov. 08, 2015
Pre-amplifier	BBV9743	9743-151	SCHWARZ BECK	Jan. 13, 2015	Jan. 12, 2016
Pre-amplifier	BBV9718	9718-282	SCHWARZ BECK	Jan. 13, 2015	Jan. 12, 2016
Loop antenna	PLA-1030/B	1029	A.R.A.	Nov. 09, 2014	Nov. 08, 2015
Ultra Broadband ANT	JB6	A090414	Sunol Sciences	Jan. 13, 2015	Jan. 12, 2016
Horn Antenna	DRH-118	A091114	Sunol Sciences	Jan. 13, 2015	Jan. 12, 2016
Horn Antenna	3160	--	ETS LINDGREN	Nov. 09, 2014	Nov. 08, 2015

6.2 Limit

According to 15.231(b) requirements, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Filed Strength of Fundamental (microvolts/meter)	Filed Strength of Spurious Emission (microvolts/meter)
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		
[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.]		

According to 15.231(b) , 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 Section 15.209, whichever limit permits a higher field strength. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	$20\log 2400/F \text{ (kHz)} + 80$
0.490-1.705	3	$20\log 24000/F \text{ (kHz)} + 40$
1.705-30	3	$20\log 30 + 40$
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1) Emission level dBuV = $20 \log$ Emission level uV/m

2) In the Above Table, the tighter limit applies at the band edges.

3) Distance refers to the distance in meters between the measuring instrument antenna and the E.U.T.

4) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula $Ld1 = Ld2 * (d2/d1)$

6.3 E.U.T. operating condition

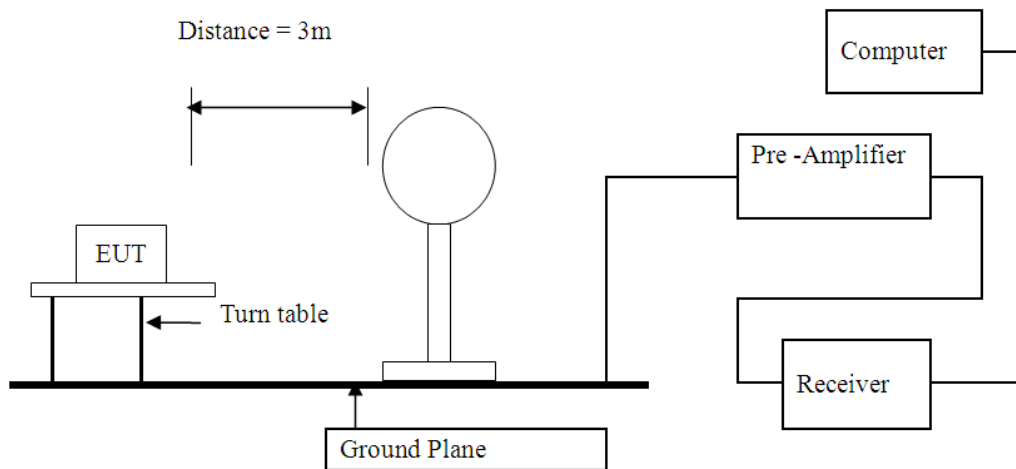
Operating condition is according to ANSI C63.10 -2009

6.4 Test specification

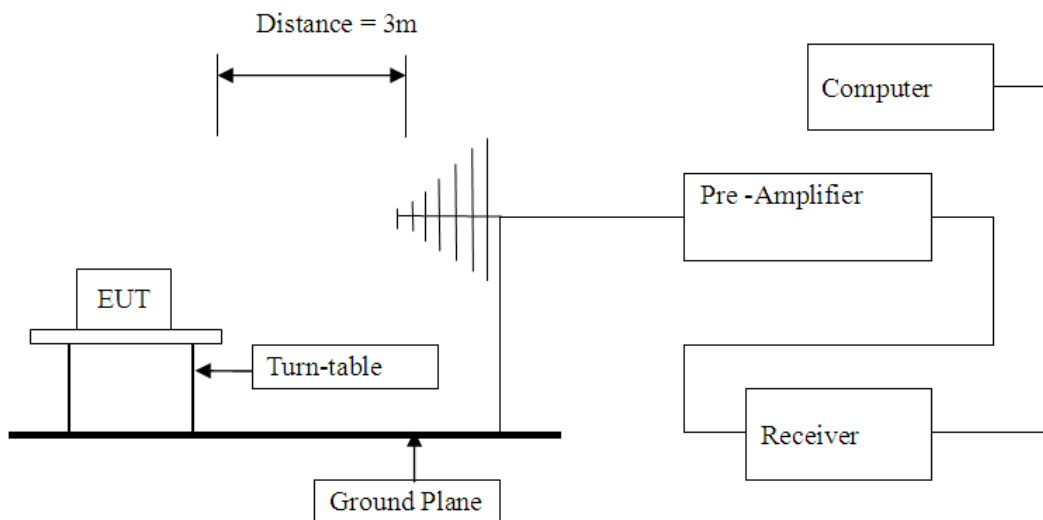
Environmental conditions: Temperature 25° C Humidity: 50% Atmospheric pressure: 103kPa

6.5 Block diagram of test setup

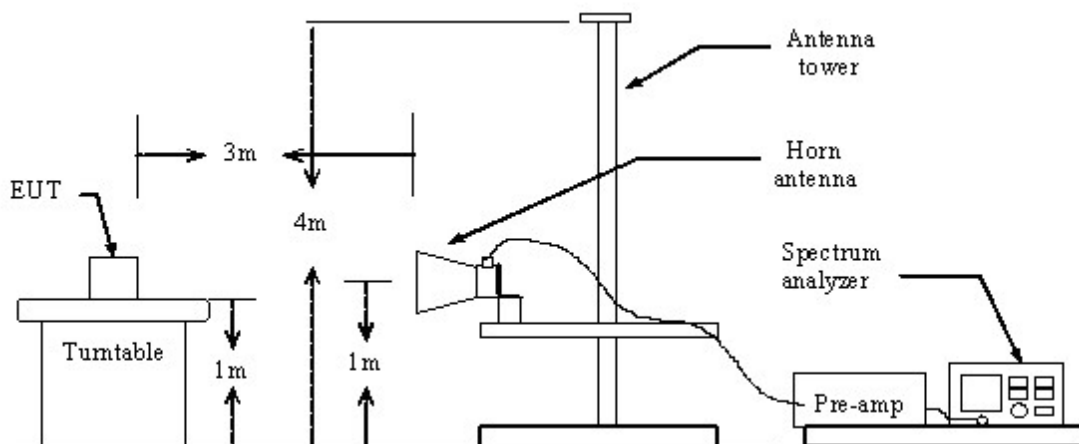
Below 30 MHz



30 MHz to 1000 MHz



Above 1000 MHz



6.6 Test procedure

The EUT is placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2009 on radiated emission Test. The frequency range from 30MHz to 1000MHz and above 1GHz. is investigated. All measurements for radiated emissions within the restricted bands were performed using a Quasi-Peak detector with 120kHz RBW below 1GHz and a Peak and Average detector with 1MHz RBW above 1GHz. A average value can be caluclated from peak value using duty cycle factor both from 30MHz to 1000MHz and above 1GHz.

Pretest were conducted in x, y, z position and the worst case x position test was recorded in the test report.

6.7 Test result

Pass

Radiated Emission (9 kHz-30 MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Limit@3m (dB μ V/m)
--	--	--
--	--	--

The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Radiated Emission (30MHz-1000MHz)

Low channel: 460 MHz

Frequency (MHz)	Emission Level@3m (dBμV/m)	Limit@3m (dBμV/m)	Antenna Polarity	Remark
460	89.26	93.68	H	Peak
460	84.84	93.68	V	Peak
325.8	31.25	46.00	H	QP
920	47.15	53.79	H	QP
1380	49.82	74.00	H	Peak
325.8	29.28	46.00	V	QP
920	42.64	53.79	V	QP
1380	40.81	74.00	V	Peak

Frequency (MHz)	Peak Emission Level@3m (dBμV/m)	AV Factor (dB)	AV Emission Level@3m (dBμV/m)	Limit@3m (dBμV/m)	Antenna Polarity	Remark
460	89.26	-15.92	73.34	73.68	H	AV
460	84.84	-15.92	68.92	73.68	V	AV
1380	49.82	-15.92	33.90	54.00	H	AV
1380	40.81	-15.92	24.89	54.00	V	AV

High channel: 469.5 MHz

Frequency (MHz)	Emission Level@3m (dBμV/m)	Limit@3m (dBμV/m)	Antenna Polarity	Remark
469.5	89.59	93.96	H	Peak
469.5	83.77	93.96	V	Peak
325.8	33.64	46.00	H	QP
939	47.58	53.79	H	QP
1408.5	50.18	74.00	H	Peak
325.8	30.31	46.00	V	QP
939	42.39	53.79	V	QP
1408.5	42.76	74.00	V	Peak

Frequency (MHz)	Peak Emission Level@3m (dBμV/m)	AV Factor (dB)	AV Emission Level@3m (dBμV/m)	Limit@3m (dBμV/m)	Antenna Polarity	Remark
469.5	89.59	-15.92	73.67	73.96	H	AV
469.5	83.77	-15.92	67.85	73.96	V	AV
1408.5	50.18	-15.92	34.26	54.00	H	AV
1408.5	42.76	-15.92	26.84	54.00	V	AV

Note: 1) Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor

2) Test Frequency form 9kHz to 5GHz, the emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

4) AV Emission level = Peak Emissions level +AV Factor

5) AV Factor = 20 log(Duty Cycle)

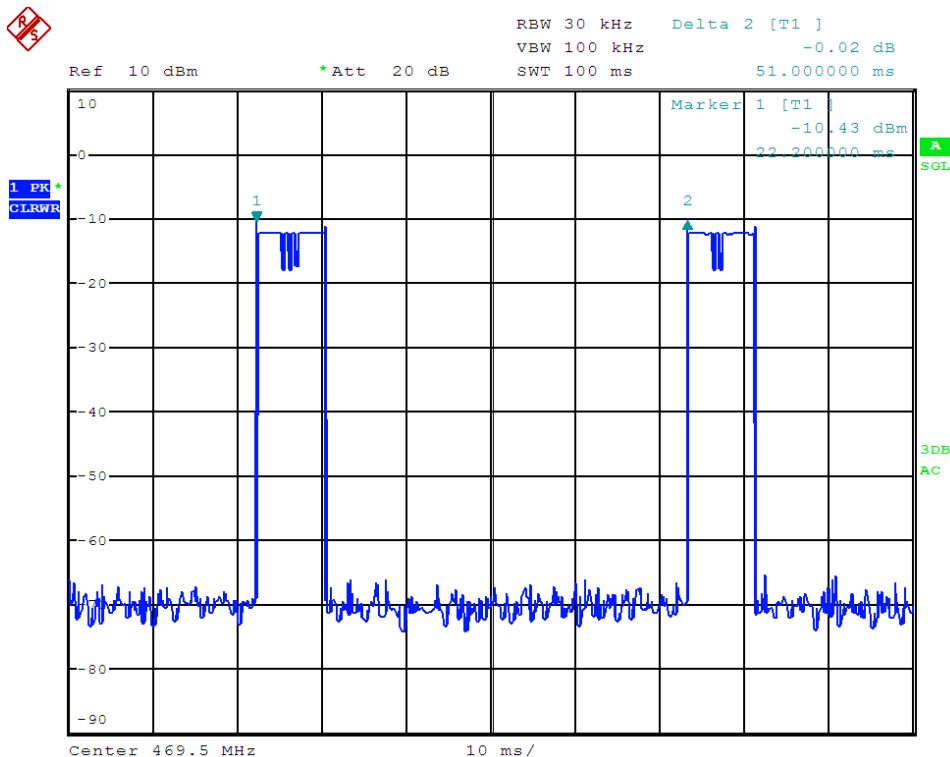
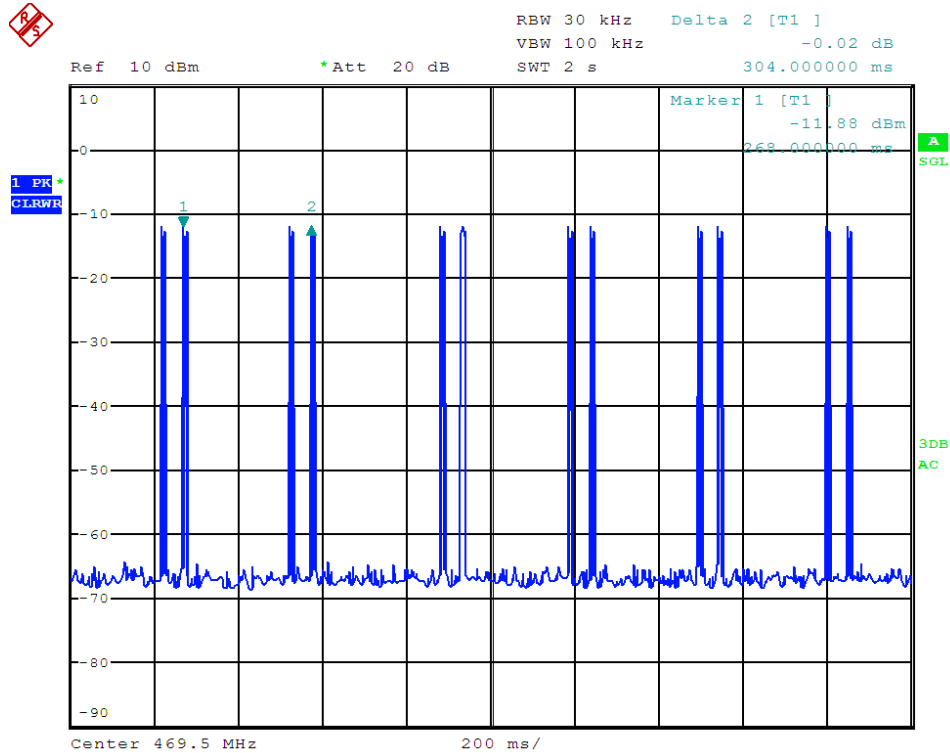
Duty cycle test data as follows

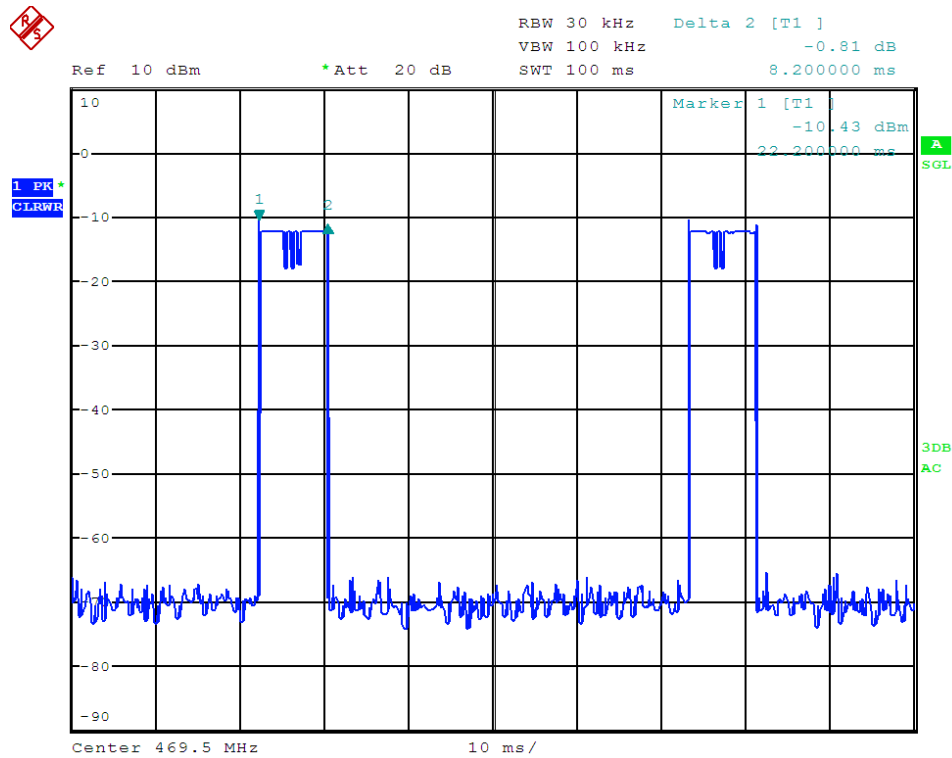
Total time one cycle	Effective time one cycle	Duty Cycle	AV Factor(dB)
51 ms	8.2 ms	0.16	-15.92

Effective time one cycle=8.2 ms

Duty Cycle= Effective time one cycle/ Total time one cycle=0.16

AV Factor=20 log DC=-15.92





7.0 20dB Bandwidth Measurement

7.1 Test equipment

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	Nov. 09, 2014	Nov. 08, 2015

7.2 Test specification

Environmental conditions: Temperature 23° C Humidity: 51% Atmospheric pressure: 103kPa

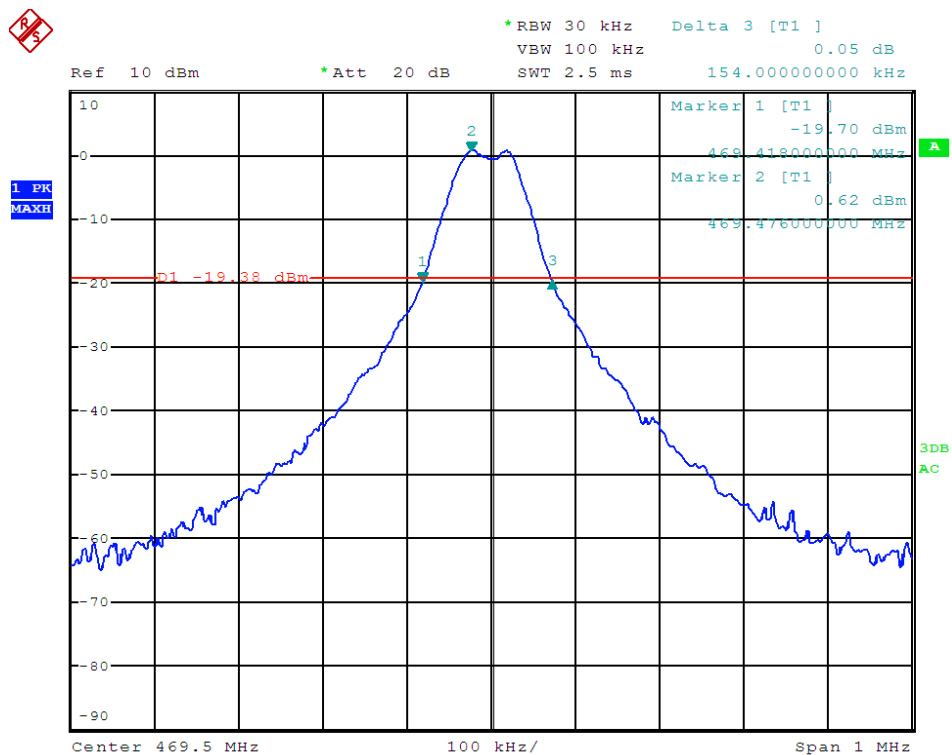
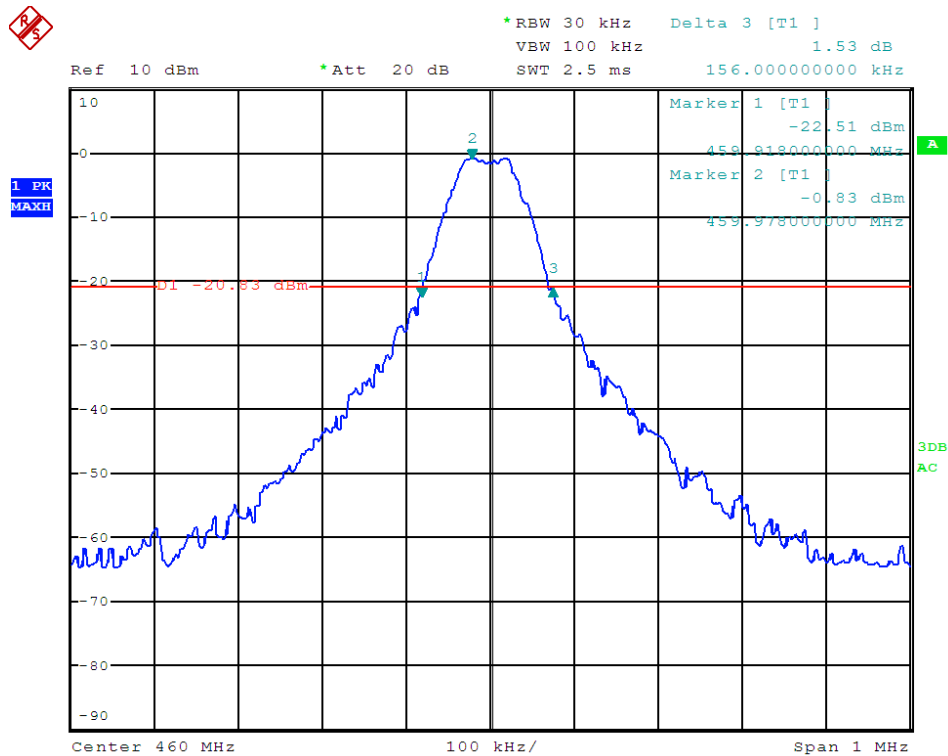
8.3 Block diagram of setup

7.3 Limit

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

7.4 Test result

Frequency	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
460 MHz	156	1150	PASS
469.5 MHz	154	1173.75	PASS



*****END OF REPORT*****