

FCC Part 15C

Measurement and Test Report

For

Cross Point b.v.

Waanderweg 12, Emmen, 7812 HZ, Netherlands

FCC ID: N9G-CP450FORTRX

FCC Rule(s):	<u>FCC Part 15.223</u>
Product Description:	<u>Electronic Article Surveillance(EAS) Pedestal</u>
Tested Model:	<u>FORTUS RFM40</u>
Report No.:	<u>STR18088168I</u>
Sample Receipt Date:	<u>2018-08-04</u>
Tested Date:	<u>2018-08-05 to 2018-08-24</u>
Issued Date:	<u>2018-08-24</u>
Tested By:	<u>Mike Shi / Engineer</u> <i>Mike Shi</i>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Cross Point b.v.
Address of applicant: Waanderweg 12, Emmen, 7812 HZ, Netherlands

Manufacturer: Cross Point b.v.
Address of manufacturer: Waanderweg 12, Emmen, 7812 HZ, Netherlands

General Description of EUT	
Product Name:	Electronic Article Surveillance(EAS) Pedestal
Trade Name:	/
Model No.:	FORTUS RFM40
Adding Model(s):	SOLUS RFM40
Rated Voltage:	DC15V
Power Adapter Model:	MODEL:15VDC/60W INPUT:100-240VAC 1.4A 47-63Hz OUTPUT:15VDC/60W
The system is an EAS (Electronic Article Surveillance) system for detection of 8.2MHz EAS labels used for in-store retail applications. The system operates in the frequency range: 7601.00 kHz up to 8567.67 kHz.	
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model FORTUS RFM40, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Frequency Range:	7601.00-8567.67kHz
Max. Field Strength:	78.92dBuV/m(3m)
Antenna Type:	Coil Antenna
Number of Channel:	30

Center Frequency of Each of Channel:

No.	Frequency (kHz)	No.	Frequency (kHz)	No.	Frequency (kHz)
1	7601.00	11	7934.33	21	8267.67
2	7634.33	12	7967.67	22	8301.00
3	7667.67	13	8001.00	23	8334.33
4	7701.00	14	8034.33	24	8367.67
5	7734.33	15	8067.67	25	8401.00
6	7767.67	16	8101.00	26	8434.33
7	7801.00	17	8134.33	27	8467.67
8	7834.33	18	8167.67	28	8501.00
9	7867.67	19	8201.00	29	8534.33
10	7901.00	20	8234.33	30	8567.67

So the fundamental emission is outside of the bands listed in Section 15.205 (a).

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.223: Operation within the band 1.705-10 MHz.

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013,

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Transmitting	/

Test Conditions	
Temperature:	25 °C
Relative humidity	45 %.
ATM Pressure:	1019 mbar

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Cable	1.8	Unshielded	With Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Frequency Deviation	2.3%	± 5%
Conducted Emissions	Conducted	9-150kHz ± 3.74dB
		0.15-30MHz ± 3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ± 4.52dB
		0.2-1GHz ± 5.56dB
		1-6GHz ± 3.84dB
		6-18GHz ± 3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2018-05-22	2019-05-21
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2018-05-22	2019-05-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2018-05-22	2019-05-21
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2018-05-22	2019-05-21
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2020-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2020-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2020-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2018-05-22	2019-05-21
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2018-05-22	2019-05-21
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2018-05-22	2019-05-21
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2018-05-22	2019-05-21
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2018-05-22	2019-05-21
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2018-03-19	2019-03-18
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2018-03-19	2019-03-18
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2018-03-19	2019-03-18
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2018-03-19	2019-03-18
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2018-03-19	2019-03-18
SEMT-C006	Cable	Zheng DI	1M0RFC	/	2018-03-19	2019-03-18

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203	Antenna Requirement	Compliant
§15.205,15.209, 15.223	Radiated Emission and Field Strength	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.223	6dB Emission Bandwidth	Compliant

N/A: not applicable

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has an integral antenna, fulfill the requirement of this section.

4. Radiated Emission and Field Strength

4.1 Standard Applicable

According to §15.223(a), (a) The field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in §15.35(b) for limiting peak emissions apply.

(b) The field strength of emissions outside of the band 1.705-10.0 MHz shall not exceed the general radiated emission limits in §15.209.

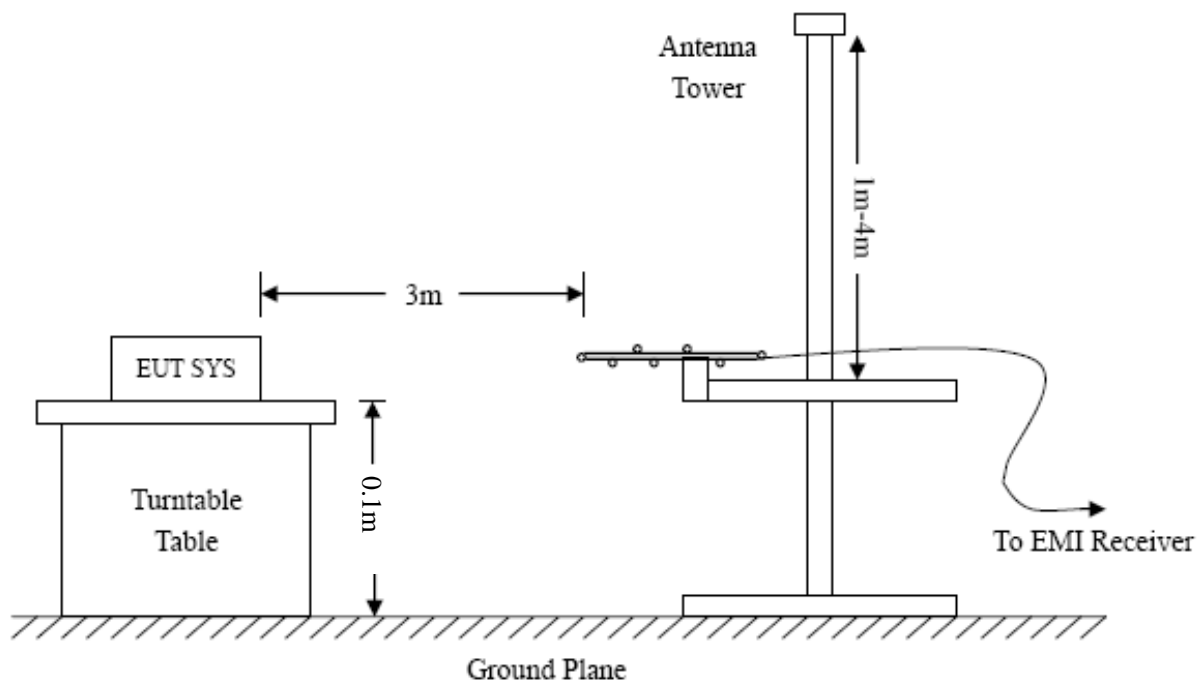
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

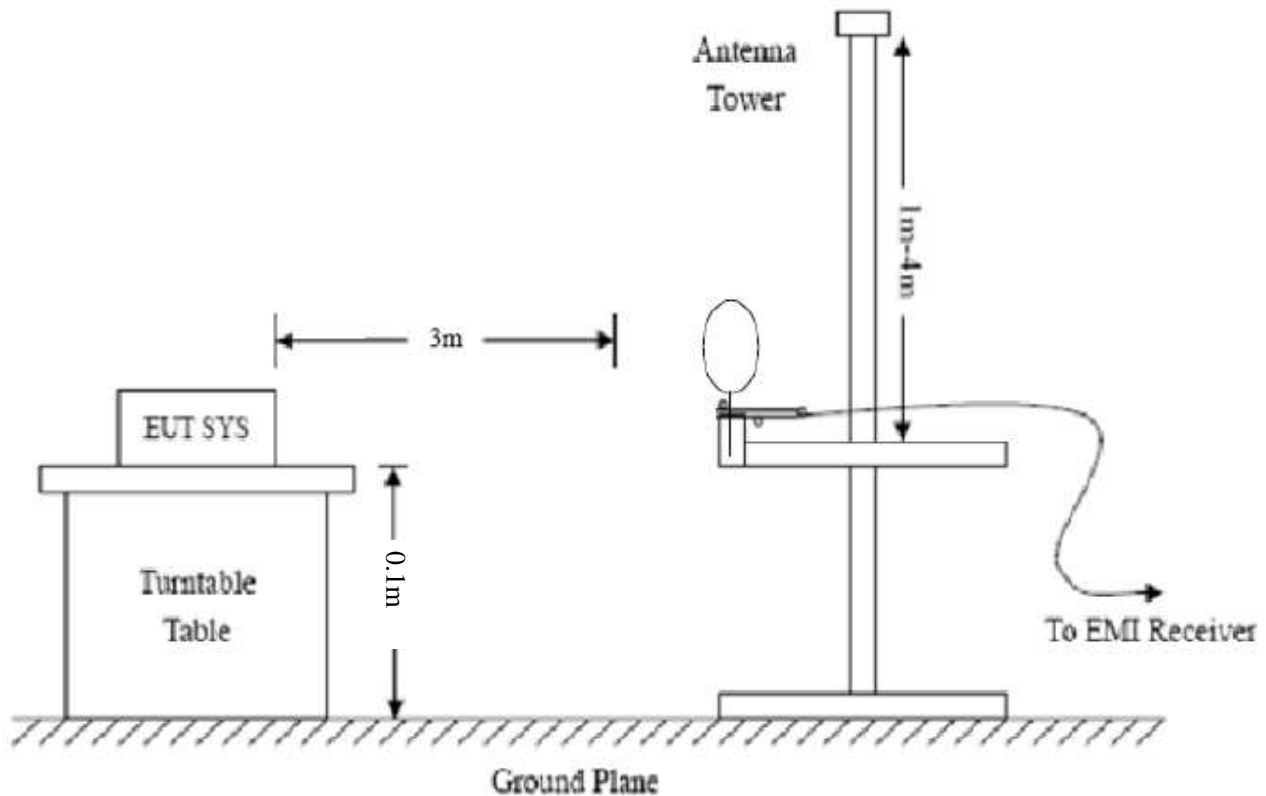
4.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.225(d) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.





Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

$$\text{Emission level dB}\mu\text{V/m for Fundamental} = 20\log(100) + 40\log(30/3) \text{ dB}\mu\text{V/m};$$

4.4 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

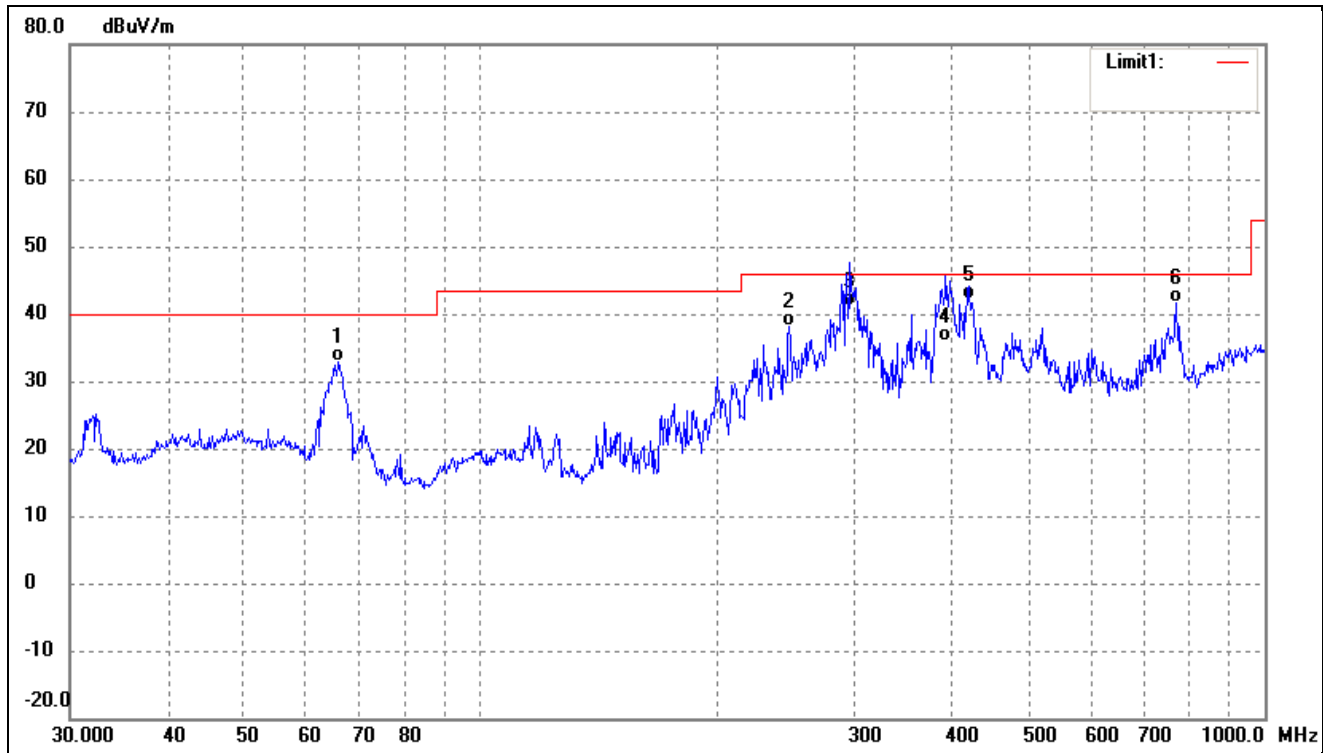
➤ Below 30MHz

Test Mode	TM1	Polarity:	X
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	0.0155	96.48	-26.28	70.20	123.78	-53.58	63	100	peak
2	0.0311	93.91	-26.27	67.64	117.74	-50.10	146	100	peak
3	0.0627	86.23	-26.27	59.96	111.65	-51.69	72	100	peak
4	0.6440	87.78	-28.79	58.99	69.48	-10.49	116	100	peak
5	1.8979	81.31	-30.80	50.51	69.50	-18.99	260	100	peak
6	7.601	99.37	-30.45	68.92	83.52	-14.60	260	100	Fundamental Low (PK)
	7.601	88.56	-30.45	58.11	63.52	-5.41	260	100	Fundamental Low(AVG)
7	8.101	98.13	-30.45	67.68	83.52	-25.84	146	100	Fundamental Mid (PK)
	8.101	87.32	-30.45	56.87	63.52	-6.65	146	100	Fundamental Mid(AVG)
8	8.56767	99.17	-30.45	68.72	83.52	-14.80	111	100	Fundamental High(PK)
	8.56767	88.36	-30.45	57.91	63.52	-5.61	111	100	Fundamental High(AVG)
9	25.4560	79.54	-28.45	51.09	69.50	-18.41	150	100	peak

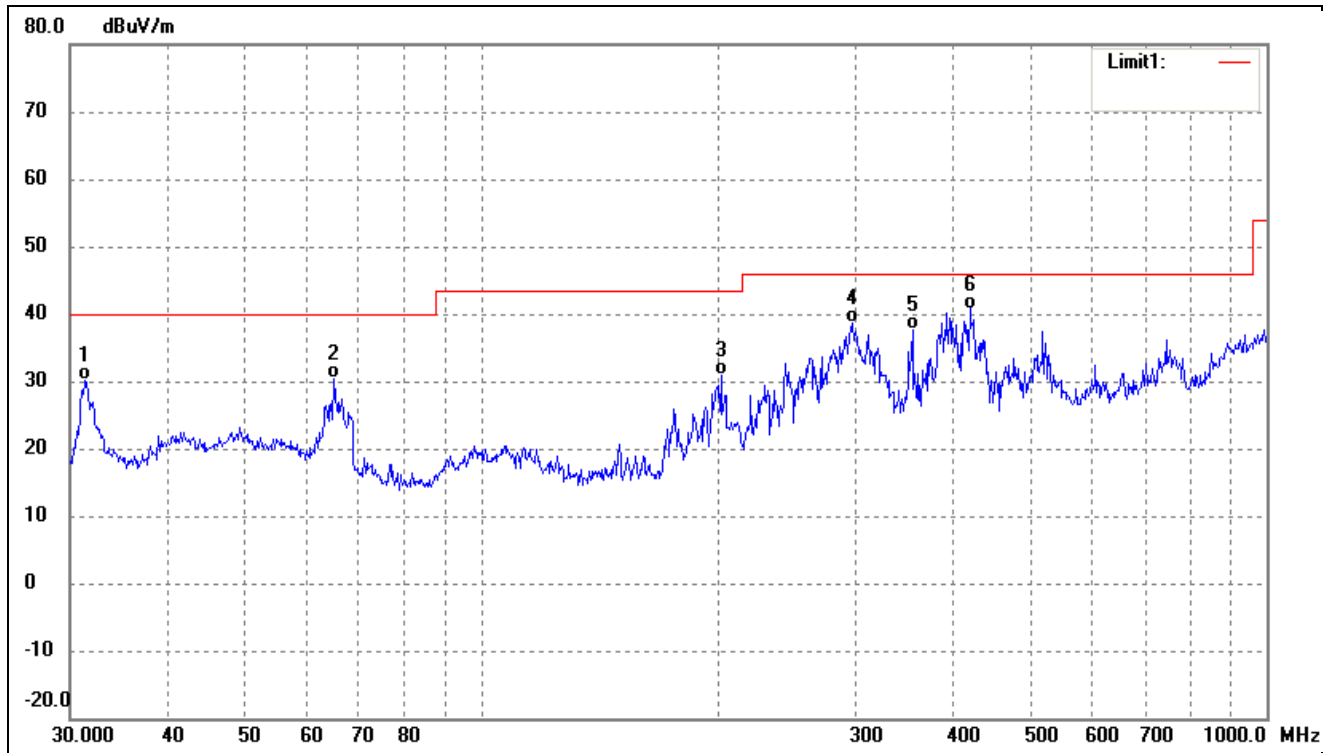
➤ Above 30MHz

Test Mode	TM1	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	66.0342	48.62	-15.63	32.99	40.00	-7.01	142	100	QP
2	247.6819	47.92	-9.82	38.10	46.00	-7.90	106	100	QP
3	296.1836	48.50	-7.49	41.01	46.00	-4.99	55	100	QP
4	392.0951	42.60	-6.75	35.85	46.00	-10.15	186	100	QP
5	419.1081	48.20	-6.12	42.08	46.00	-3.92	204	100	QP
6	771.4486	43.54	-1.86	41.68	46.00	-4.32	187	100	QP

Test Mode	TM1	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	31.3992	46.23	-16.02	30.21	40.00	-9.79	81	100	QP
2	65.1145	45.74	-15.28	30.46	40.00	-9.54	193	100	QP
3	202.1005	43.08	-12.19	30.89	43.50	-12.61	56	100	QP
4	297.2241	46.14	-7.47	38.67	46.00	-7.33	123	100	QP
5	354.1831	44.32	-6.61	37.71	46.00	-8.29	174	100	QP
6	419.1081	46.87	-6.12	40.75	46.00	-5.25	262	100	QP

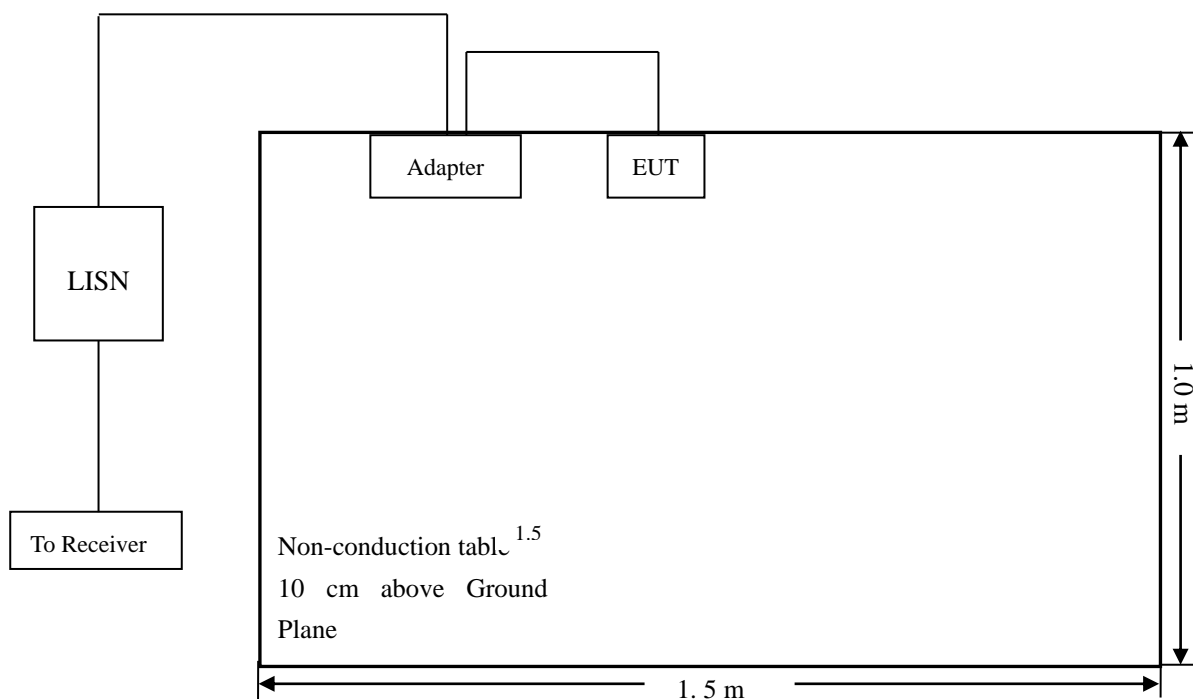
5. Conducted Emissions

5.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

5.2 Basic Test Setup Block Diagram



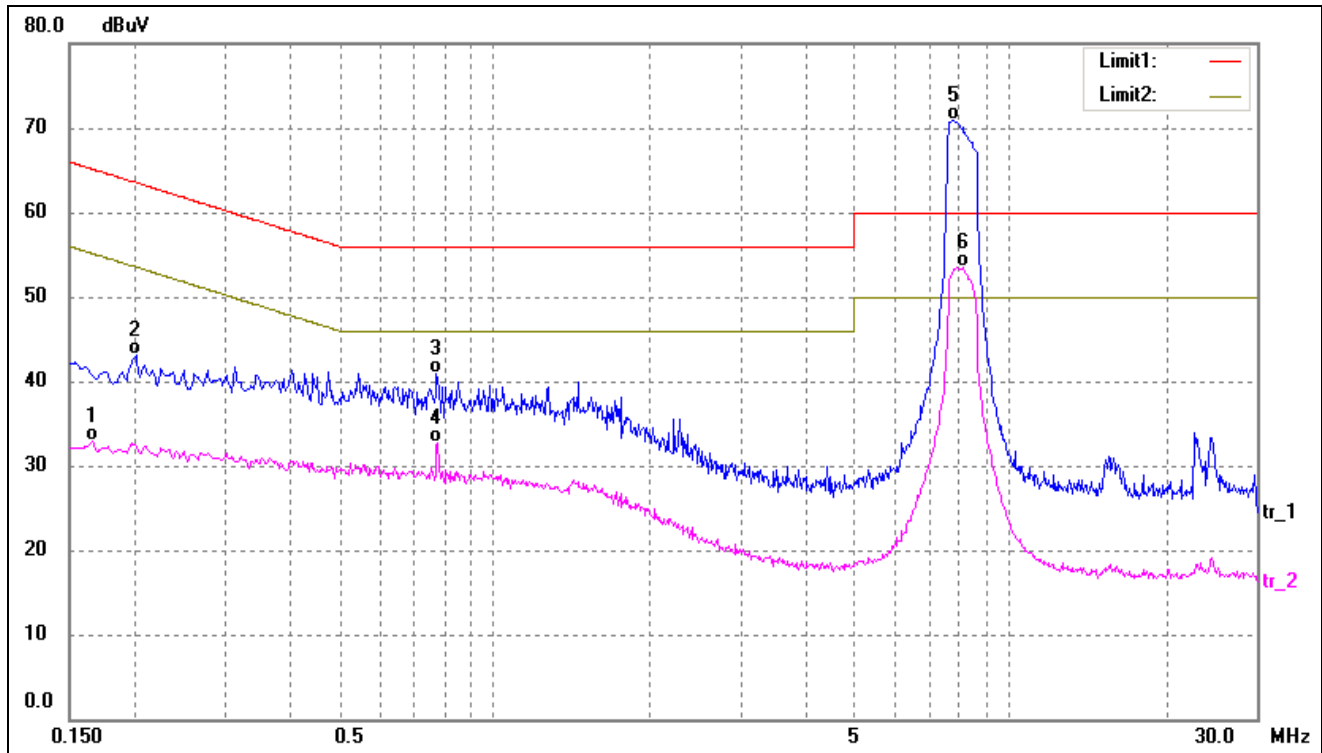
5.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth.....	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

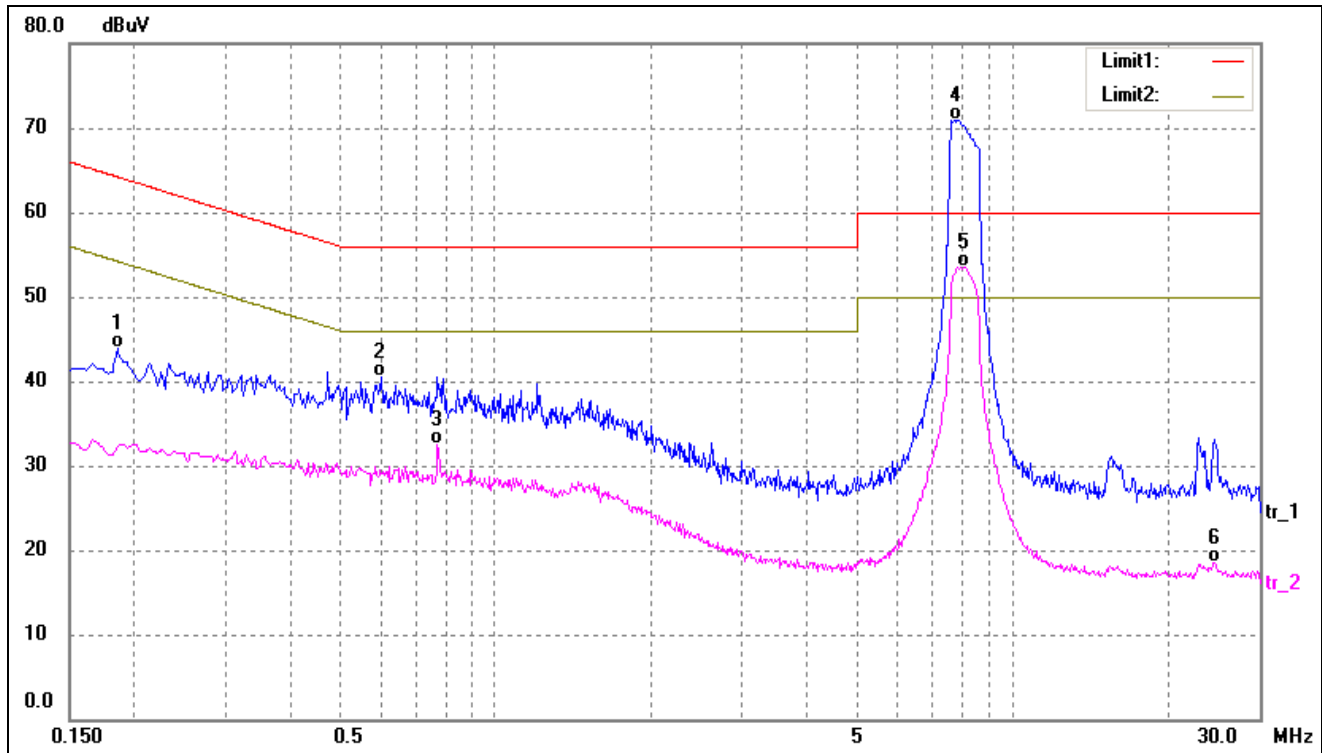
5.4 Summary of Test Results/Plots

Test Mode	TM1(AC120V 60Hz)	Polarity:	Neutral
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	12.87	19.98	32.85	55.15	-22.30	AVG
2	0.2020	23.20	19.92	43.12	63.52	-20.40	QP
3	0.7740	21.13	19.79	40.92	56.00	-15.08	QP
4	0.7780	12.86	19.79	32.65	46.00	-13.35	AVG
5*	8.2	51.10	19.74	70.84	/	/	fundamental
6X	8.2	33.86	19.73	53.59	/	/	fundamental

Test Mode	TM1(AC120V 60Hz)	Polarity:	Line
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1860	23.86	19.95	43.81	64.21	-20.40	QP
2	0.6020	20.67	19.81	40.48	56.00	-15.52	QP
3	0.7740	12.73	19.79	32.52	46.00	-13.48	AVG
4*	8.2	51.24	19.73	70.97	/	/	fundamental
5X	8.2	33.87	19.73	53.60	/	/	fundamental
6	24.5460	-1.04	19.61	18.57	50.00	-31.43	AVG

6. 6dB EMISSION BANDWIDTH

6.1 Applicable Standard

According to §15.223(a), (a) The field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in §15.35(b) for limiting peak emissions apply.

6.2 Test Procedure

According to the ANSI 63.10-2013, the emission bandwidth test method as follows.

Set span = 3MHz, centered on a transmitting channel

RBW \geq 1% 6dB Bandwidth, VBW \geq RBW

Sweep = auto

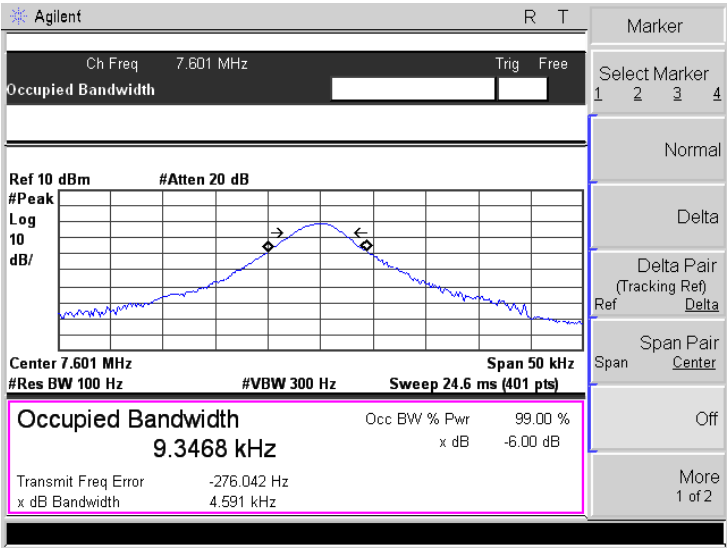
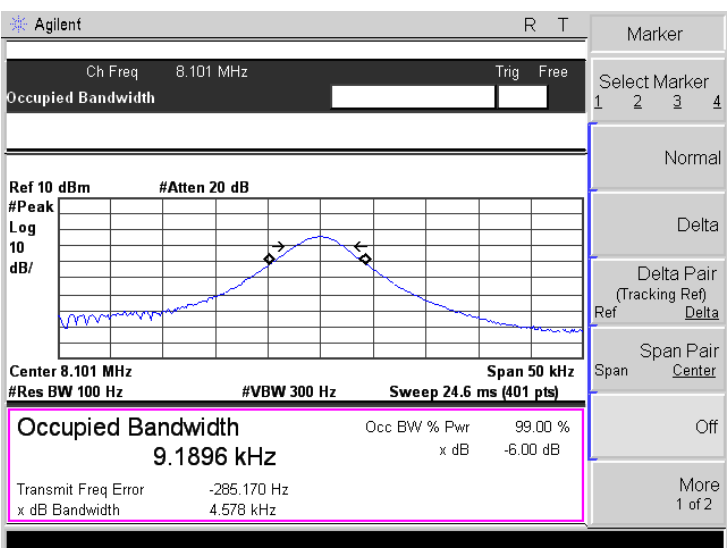
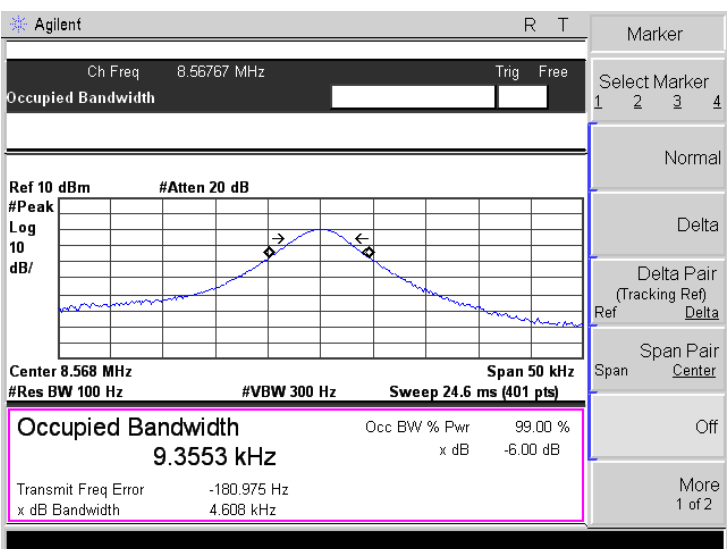
Detector function = peak

Trace = max hold

All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 6dB down of the emission.

6.3 Summary of Test Results/Plots

Channel	Tx Frequency (MHz)	6dB Emission bandwidth(kHz)
Low	7.601	4.591
Middle	8.101	4.578
High	8.56767	4.608

Low Channel	 <p>Agilent R T</p> <p>Ch Freq 7.601 MHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 10 dBm #Atten 20 dB</p> <p>#Peak Log 10 dB/</p> <p>Center 7.601 MHz Span 50 kHz</p> <p>#Res BW 100 Hz #VBW 300 Hz Sweep 24.6 ms (401 pts)</p> <p>Occupied Bandwidth 9.3468 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -6.00 dB</p> <p>Transmit Freq Error -276.042 Hz</p> <p>x dB Bandwidth 4.591 kHz</p> <p>Marker</p> <p>Select Marker 1 2 3 4</p> <p>Normal</p> <p>Delta</p> <p>Delta Pair (Tracking Ref) Ref Delta</p> <p>Span Pair Span Center</p> <p>Off</p> <p>More 1 of 2</p>
Middle Channel	 <p>Agilent R T</p> <p>Ch Freq 8.101 MHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 10 dBm #Atten 20 dB</p> <p>#Peak Log 10 dB/</p> <p>Center 8.101 MHz Span 50 kHz</p> <p>#Res BW 100 Hz #VBW 300 Hz Sweep 24.6 ms (401 pts)</p> <p>Occupied Bandwidth 9.1896 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -6.00 dB</p> <p>Transmit Freq Error -285.170 Hz</p> <p>x dB Bandwidth 4.578 kHz</p> <p>Marker</p> <p>Select Marker 1 2 3 4</p> <p>Normal</p> <p>Delta</p> <p>Delta Pair (Tracking Ref) Ref Delta</p> <p>Span Pair Span Center</p> <p>Off</p> <p>More 1 of 2</p>
High Channel	 <p>Agilent R T</p> <p>Ch Freq 8.567 MHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 10 dBm #Atten 20 dB</p> <p>#Peak Log 10 dB/</p> <p>Center 8.568 MHz Span 50 kHz</p> <p>#Res BW 100 Hz #VBW 300 Hz Sweep 24.6 ms (401 pts)</p> <p>Occupied Bandwidth 9.3553 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -6.00 dB</p> <p>Transmit Freq Error -180.975 Hz</p> <p>x dB Bandwidth 4.608 kHz</p> <p>Marker</p> <p>Select Marker 1 2 3 4</p> <p>Normal</p> <p>Delta</p> <p>Delta Pair (Tracking Ref) Ref Delta</p> <p>Span Pair Span Center</p> <p>Off</p> <p>More 1 of 2</p>

7. Duty Cycle correction

7.1 Standard Applicable

According to 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

7.2 Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 8.2MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

7.3 Summary of Test Results/Plots

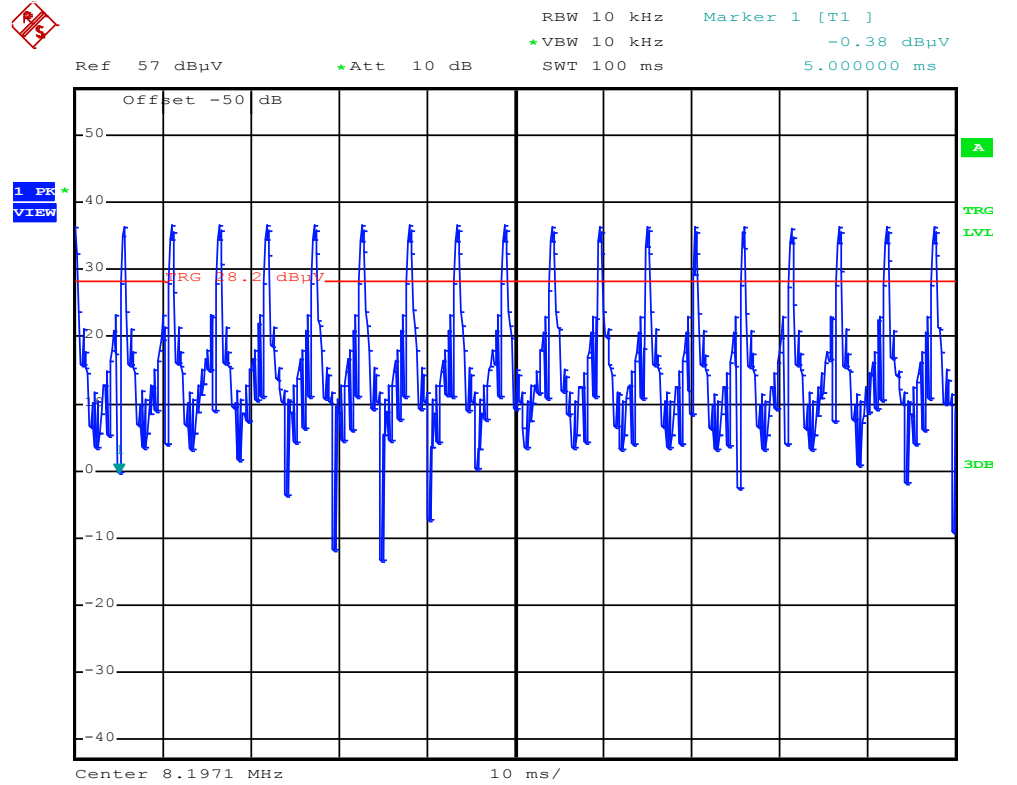
Type of Pulse	Width of Pulse (ms)	Quantity of Pulse	Transmission Time (ms)
1	1.6	18	28.8

Test Period (T_p)	Total Time (T_{on})	Duty Cycle	Duty Cycle Factor
ms	ms	%	dB
100	28.8	28.8	-10.81

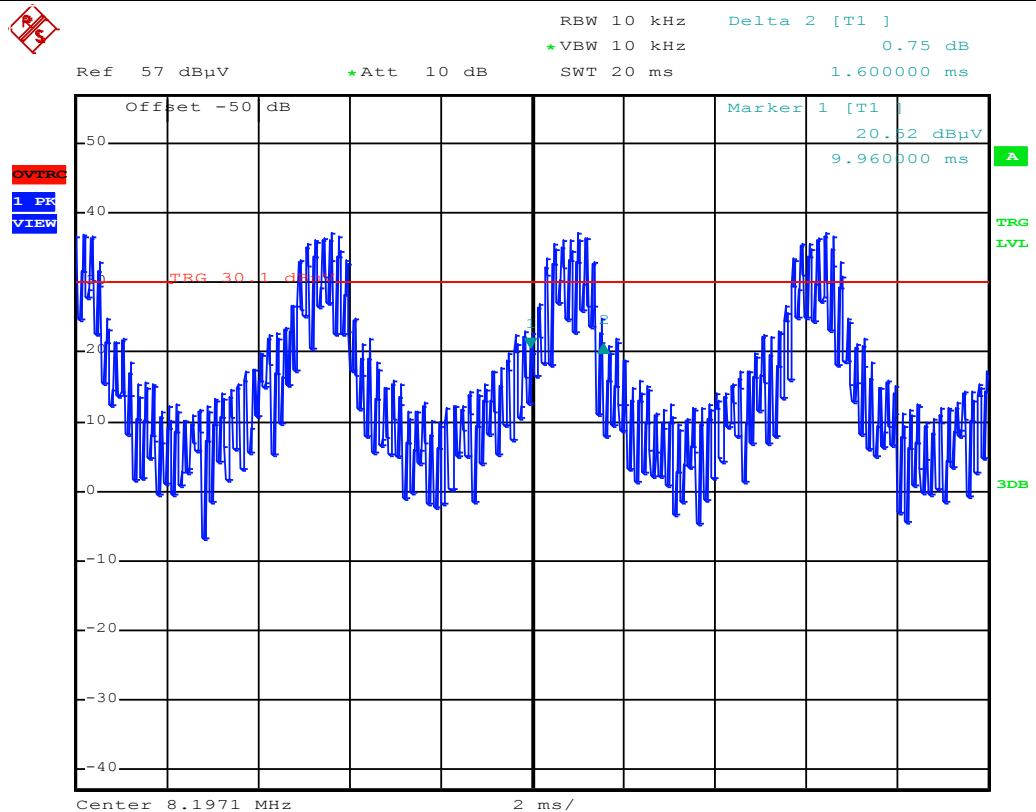
Remark: Duty Cycle Factor= $20 \cdot \log(\text{Duty Cycle})$

Please refer to the attached test plots

Test Period



Wide of Pulse



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