Test Report according to the relevant standard 47 CFR Part 15 C- Intentional Radiator
Measurement Procedure: ANSI C63.4- 2003 & RSS 210

FOR:

Vehicle Starter Interrupt System

RF Remote Model #: SPTU-1TX
RF Receiver Model #: SPTU-1

FCC ID: WXT-SPTU1
IC: 8098A-SPTU1

Passtime USA
861 South Park Drive Suite 200
Littleton/CO/80120
USA

Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment Technical characteristics and test methods for radio equipment in the frequency range 9 kHz to 40 GHz

TEST REPORT #: EMC_PASST_001_08001_FCC15.231_SPTU1_rev3
DATE: 2009-03-19

ilac-MRA ACCREDITED Certificate # 2135.01

Bluetooth

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC listed: A2LA accredited

IC recognized # 3462B

***CETECOM* Inc.**
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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

Table of Contents

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Parts 15, of Title 47 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS 210.

Company	Description	Model #
Passtime USA	**Vehicle Starter Interrupt System**	**RF Remote Model #: SPTU-1TX** **RF Receiver Model #: SPTU-1**

Technical responsibility for area of testing:

Date	Section	Name	Signature
2009-03-19	EMC & Radio	Josie Sabado (EMC Project Engineer)	Josie Sabado I am approving this document

This report is prepared by:

Date	Section	Name	Signature
2009-03-19	EMC & Radio	Satya Radhakrishna (EMC Project Engineer)	Satya Radhakrishna I am the author of this document

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	**CETECOM Inc.**
Department:	**EMC**
Address:	**411 Dixon Landing Road Milpitas, CA 95035 U.S.A.**
Telephone:	**+1 (408) 586 6200**
Fax:	**+1 (408) 586 6299**
Responsible Test Lab Manager:	**Lothar Schmidt**
Responsible Project Leader:	**Satya Radhakrishna**

2.2 Identification of the Applicant

Applicant's Name:	**Passtime USA**
Street Address:	**861 South Park Drive Suite 200**
City/State/Zip Code	**Littleton/CO/80120**
Country	**USA**
Contact Person:	**Franco Chirico**
Phone No.	**303 962 3160**
e-mail:	**fchirico@passtimeusa.com**

2.3 Identification of the Manufacturer

Applicant's Name:	**Pylon International**
Street Address:	**Ju Long Wei, Tian Xin Industrial Estate, Huang Jiang Town**
City/State/Zip Code	**Dong Guan/ Guang Dong/ 523763**
Country	**China**
Contact Person:	**Jenny Deng**
Phone No.	**86-769-8363-3663**
e-mail:	**Jenny.deng@pylonhk.com**

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	**Passtime Plus**
Description:	**Vehicle Starter Interrupt System**
Model No:	**RF Remote Model #: SPTU-1TX** **RF Receiver Model #: SPTU-1**
FCC ID: **(RF Remote)**	**WXT-SPTU1**
IC ID: **(RF Remote)**	**8098A-SPTU1**
Type(s) of Modulation: **(RF Remote)**	**ASK**
Number of Channels: **(RF Remote)**	**1**
Antenna Type: **(RF Remote)**	**Loop Antenna**
Maximum measured field strength: **(RF Remote)**	**75.09dBµV/m**

3.2 Identification of the Equipment Under Test (EUT)

EUT #	TYPE	MANF.	HW/SW version
A	**RF Remote for Vehicle Starter Interrupt System**	**Passtime USA**	**HW: SPTU-1 RF Remote: RF081011/ SW: SPTU-1 RF Remote: 1.0**
B	**RF Receiver for Vehicle Starter Interrupt System**	**Passtime USA**	**HW: SPTU-1 Device and RF Receiver: 1.0/ SW: SPTU-1 Device and RF Receiver: 3.0**

3.3 EUT Setup

The following setup(s) were used for testing.

EUT set-up no.	Combination of EUT and AE	Comments
Setup# 1	EUTA+ EUT B	RF remote set up to transmit signals to the RF receiver

4 Subject of Investigation

The Vehicle Starter Interrupt System consists of a RF remote model number SPTU-1 TX which is the transmitter and a RF receiver model SPTU-1. All the tests were performed according to setup#1 defined in section 3.3 where the RF remote transmits signals to the RF receiver. Data can be transmitted by pressing any button on the RF remote. The RF receiver is installed in a vehicle and the remote is hand held. All transmit data in this report corresponds to the output of the RF remote. The RF receiver is not subject to certification. The EUT was maximized in the X, Y, Z positions, all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Parts 15.209 and 15.231 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS 210, Issue 7, June 2007. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

5 Measurements

Test Result

Standard	Report Chapter	Requirements Headline	Test Results
FCC 15.203	5.1	Antenna Requirement	pass
FCC 15.231(b)	5.2	Field strength limits(fundamental)	pass
FCC 15.231(a)	5.3	Periodic operation characteristics	pass
FCC 15.231(c)	5.4	20 dB bandwidth	pass
FCC 15.205(b) FCC 15.209 IC RSS 210	5.5	Transmitter Radiated spurious emissions	pass
IC RSS 210	5.6	Receiver radiated emissions	pass

Test requirements kept	Yes

5.1 Antenna requirement

5.1.1 Regulation

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. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.1.2 Result

The equipment meets the requirements	yes

Test requirements kept	yes

5.2 Measurement of Transmitted Fundamental Signal Field Strength

5.2.1 Regulation FCC15.231

Fundamental Field Strength of Field Strength of Frequency Fundamental Spurious Emissions (MHz) (microvolts/meter)

Fundamental Frequency (MHz)	Field Strength of fundamental (µV/m)	Field Strength of Spurious emissions (µV/m)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750	125 to 375
174 - 260	3,750	375
260 - 470	3,750 to 12,500	375 to 1,250
Above 470	12,500	1,250

** 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, µV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.
(2) Intentional radiators operating under the provisions of this Section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in Section 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of Section 15.205 shall be demonstrated using the measurement instrumentation specified in that section.
(3) 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 higher field strength.

Section 15.33 Frequency range of radiated measurements.

(a) Unless otherwise noted in the specific rule section under which the equipment operates for an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

5.2.2 Test Procedures

The EUT and the peripheral device (when additional equipment exists) are placed on a turn table which is 0.8 m above the ground. The turn table would be allowed to rotate 360 degrees to determine the position of the maximum emission level. The test distance between the EUT and the receiving antenna are 3m. To find the maximum emission, the polarization of the receiving antenna are changed in horizontal and vertical polarization, the position of the EUT was changed in different orthogonal determinations.
ANSI C63.4 1992 Section 8 “Radiated Emissions Testing”

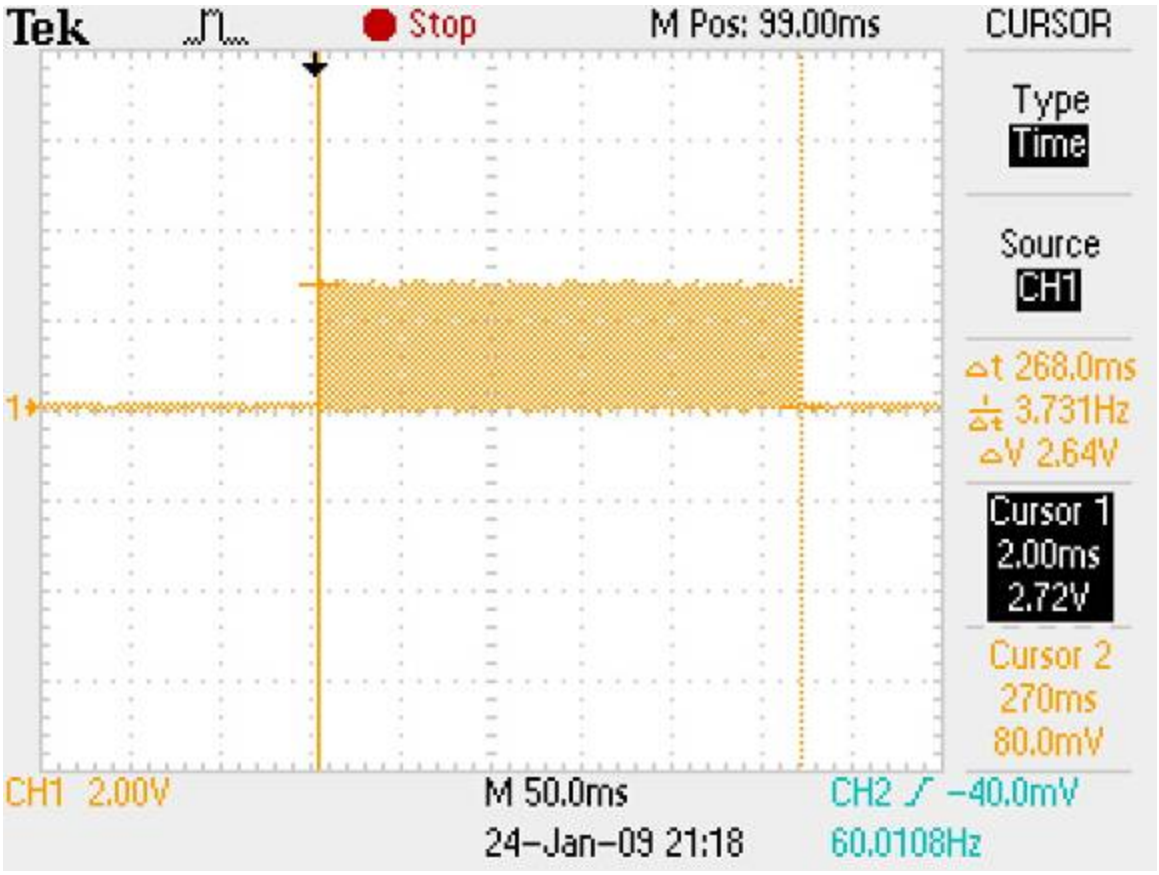
* According to Section 15.31 (f) (1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

5.2.3 Measuring the Duty Cycle

According to ANSI C63.4 2003 H.4 j(8), "When the pulse train is less than 100 ms, including blanking intervals, calculate the duty cycle by averaging the sum of the pulse widths over one complete pulse train. Alternatively, or when the pulse train exceeds 100 ms, calculate the duty cycle by averaging the sum of the pulse widths over the 100 ms width with the highest average value. [The duty cycle is the value of the sum of the pulse widths in one period (or 100 ms), divided by the length of the period (or 100 ms)]"

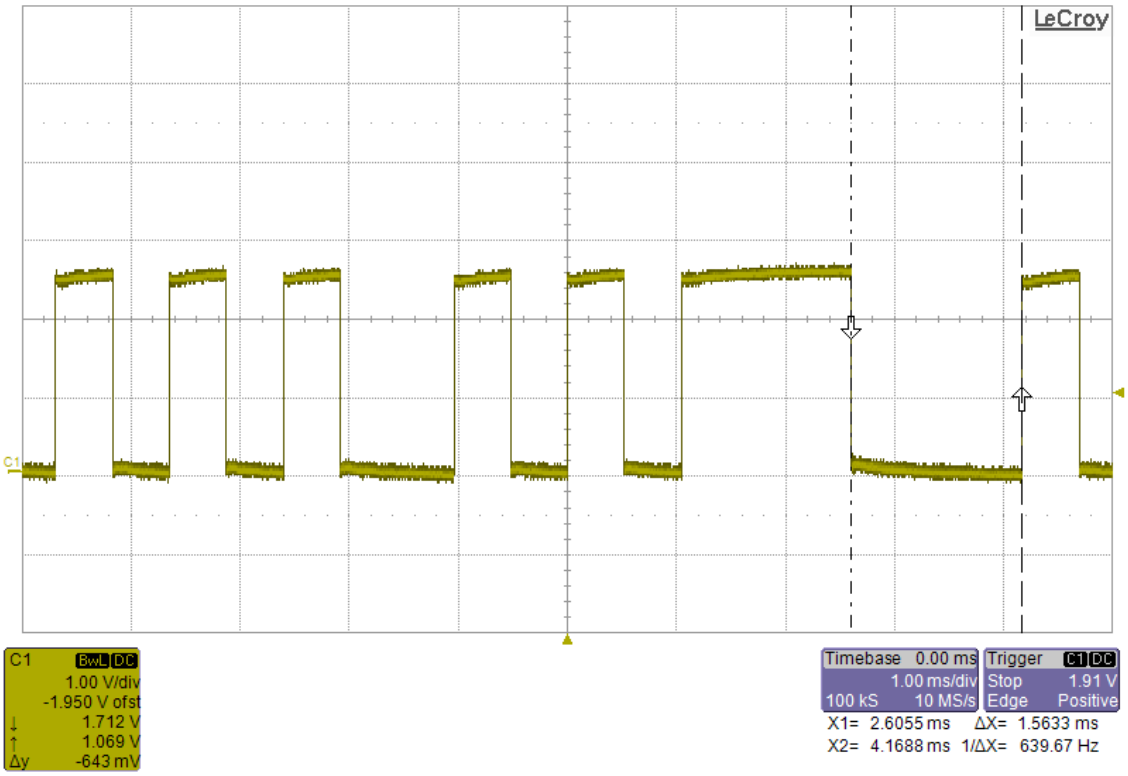
The RF remote consists of a high performance 315/433 MHz ASK/OOK (ON-OFF Keyed) transmitter IC. The chip consists of a SAW oscillator, a power amplifier, and a one-shot circuit to control the SAW oscillator. The maximum data rate is 10Kbps. When a membrane switch button is pressed on the RF remote, the key pressed is decoded by the MCU. The MCU then toggles the chips enable of the transmitter IC to transmit a burst of pulses for 268ms as shown in PLOT 5.2.3A, which eventually turns on and off the power amplifier of the transmitter IC. The total on and off time of the transmitter IC is almost the same. With the RF remote the user can send message to the SPTU-1 anti-theft device. A message contains a number of key codes. The duration of the pulses are used to encode individual key codes on the remote. The RF code is received by the RF receiver embedded on the PCB.

PLOT 5.2.3A

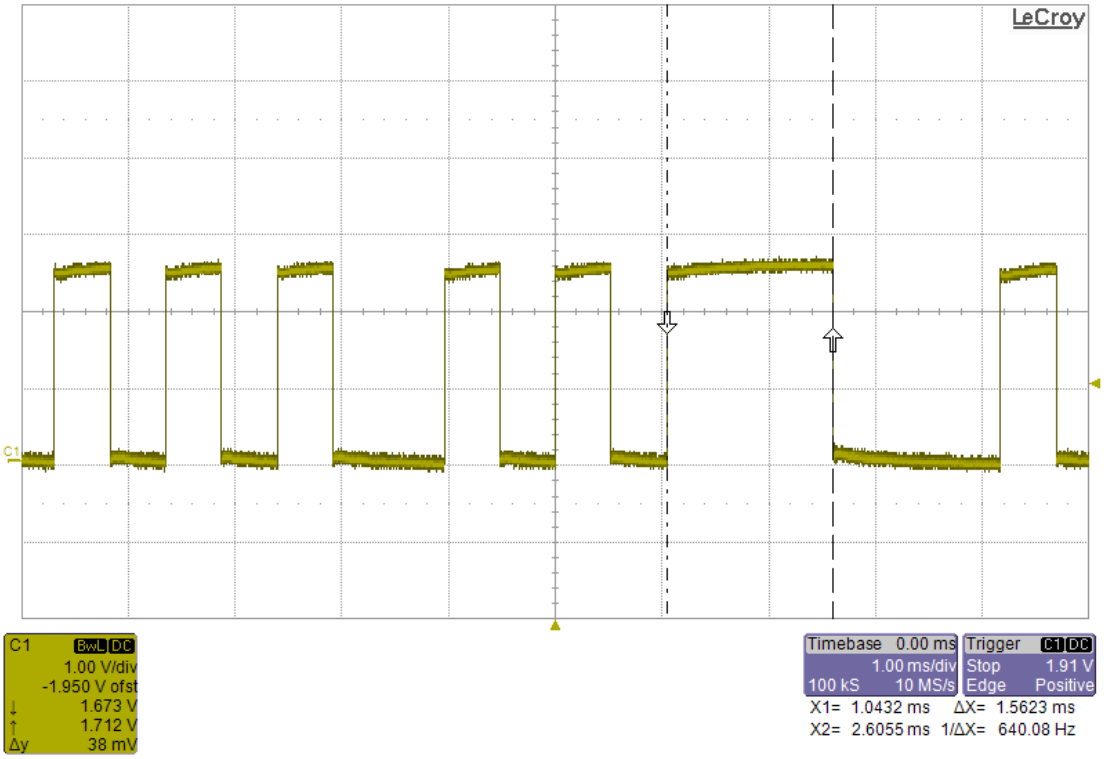


A complete remote message frame when a membrane switch button is pressed.

PLOT 5.2.3 B (Transmitter off time of a long duration pulse)



PLOT 5.2.3 C(Transmitter on time of a long duration pulse)



As seen from the plots the total on time and off time is roughly equal irrespective of the pulse width. According to the time plots above, the longest pulse width (Ton) is 1.5623ms and the longest off time is (Toff) 1.5633 ms. In a time period of 100 ms, that is roughly, 32(Ton)+32(Toff)=100ms. Therefore the total Ton time in a 100 ms time period is 49.9936 ms~**50 ms.**

5.2.4 Results

The fundamental of the unit is measured with the unit placed in horizontal, vertical and side orientations with the measuring antenna in horizontal and vertical polarizations. The orientation of the EUT and the antenna polarization at which the maximum is measured is used for the remainder of the radiated spurious measurements.
The measurements were made with a peak detector. They are converted into average values with this formula.
Average = Peak Value+20 log ((duty cycle/100))
The duty cycle of the EUT is 50 ms.

Antenna Polarization	EUT orientation	Average value (dBµV/m)
V	V	66.82
V	H	60.82
V	S	69.39
H	V	71.76
H	H	71.99
H	S	75.09

According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(434) - 7083.3333=10996.68 µV/m= **80.828 dBµV/m.** Based on the table above, the measured values are within the limit.

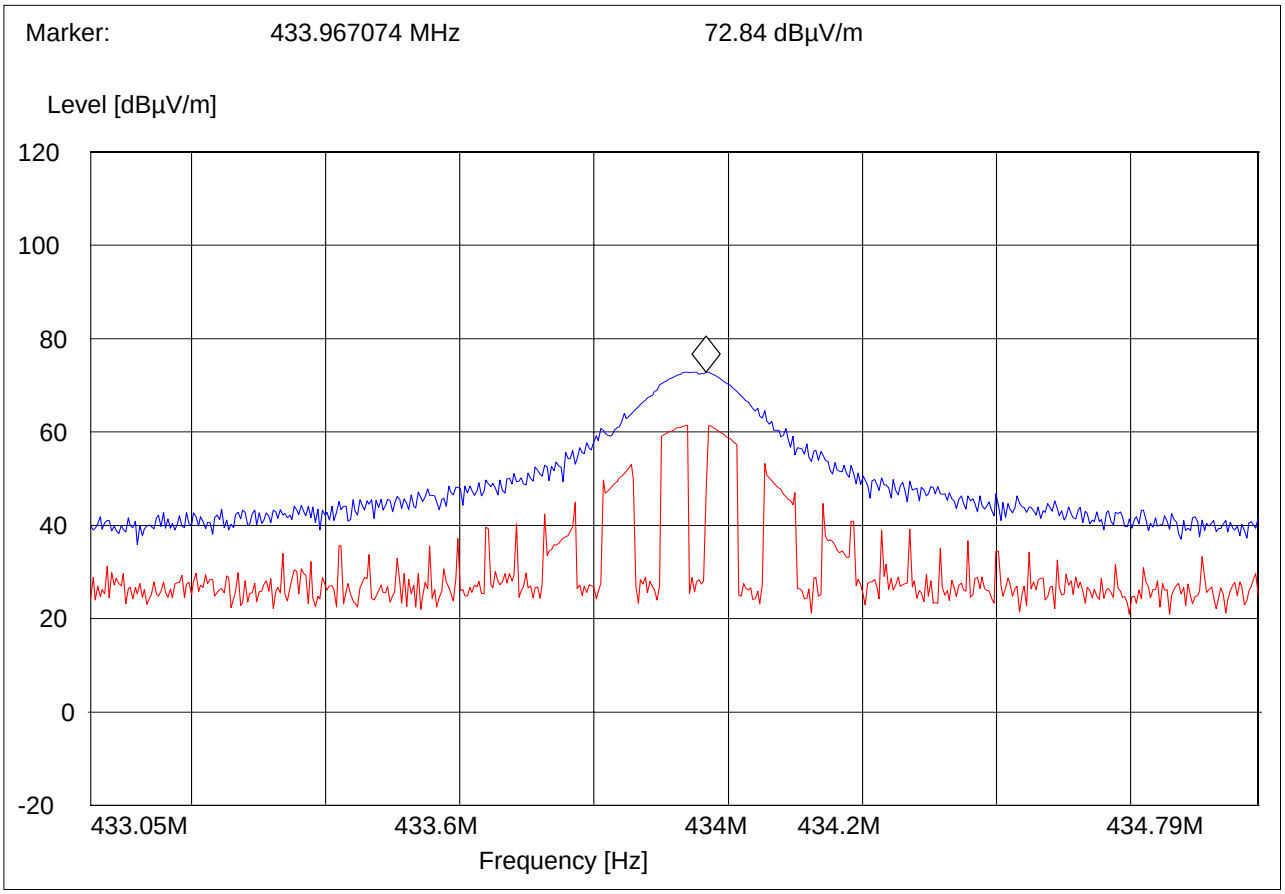
So the maximum value was measured with the EUT in Side position and the measuring antenna in Horizontal position.

PLOT 5.2.4A
ANTENNA: VERTICAL / EUT: VERTICAL

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: V
EUT Orientation: V
Test Engineer: Chris
Voltage: Battery
Comments: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.**

SWEEP TABLE: "FCC15.231_433M_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
433.1 MHz	434.8 MHz	MaxPeak MaxPeak	Coupled	100 kHz	3141-#1186_Vert

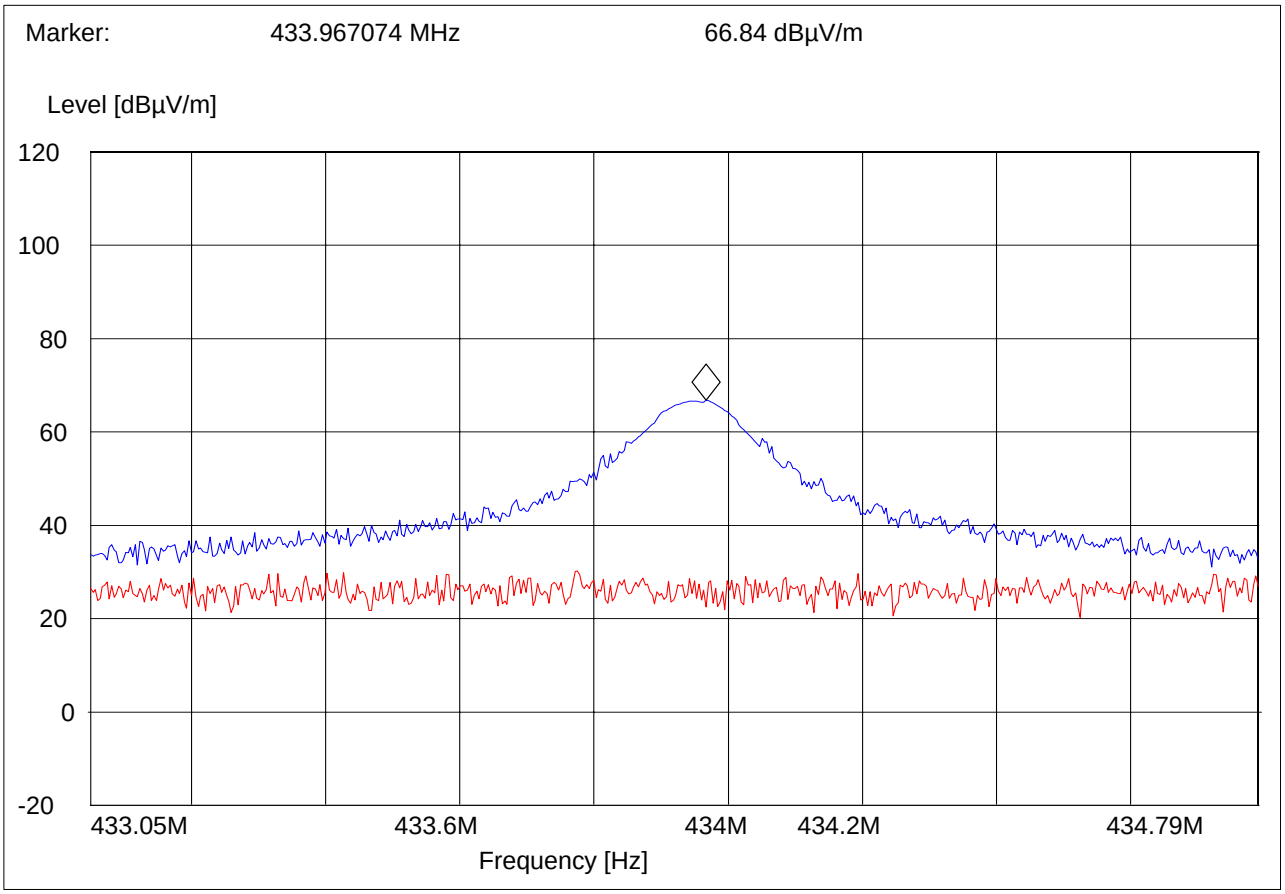


PLOT 5.2.4B
ANTENNA: VERTICAL / EUT: HORIZONTAL

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: V
EUT Orientation: H
Test Engineer: Chris
Voltage: Battery
Comments: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.**

SWEEP TABLE: "FCC15.231_433M_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
433.1 MHz	434.8 MHz	MaxPeak MaxPeak	Coupled	100 kHz	3141-#1186_Vert

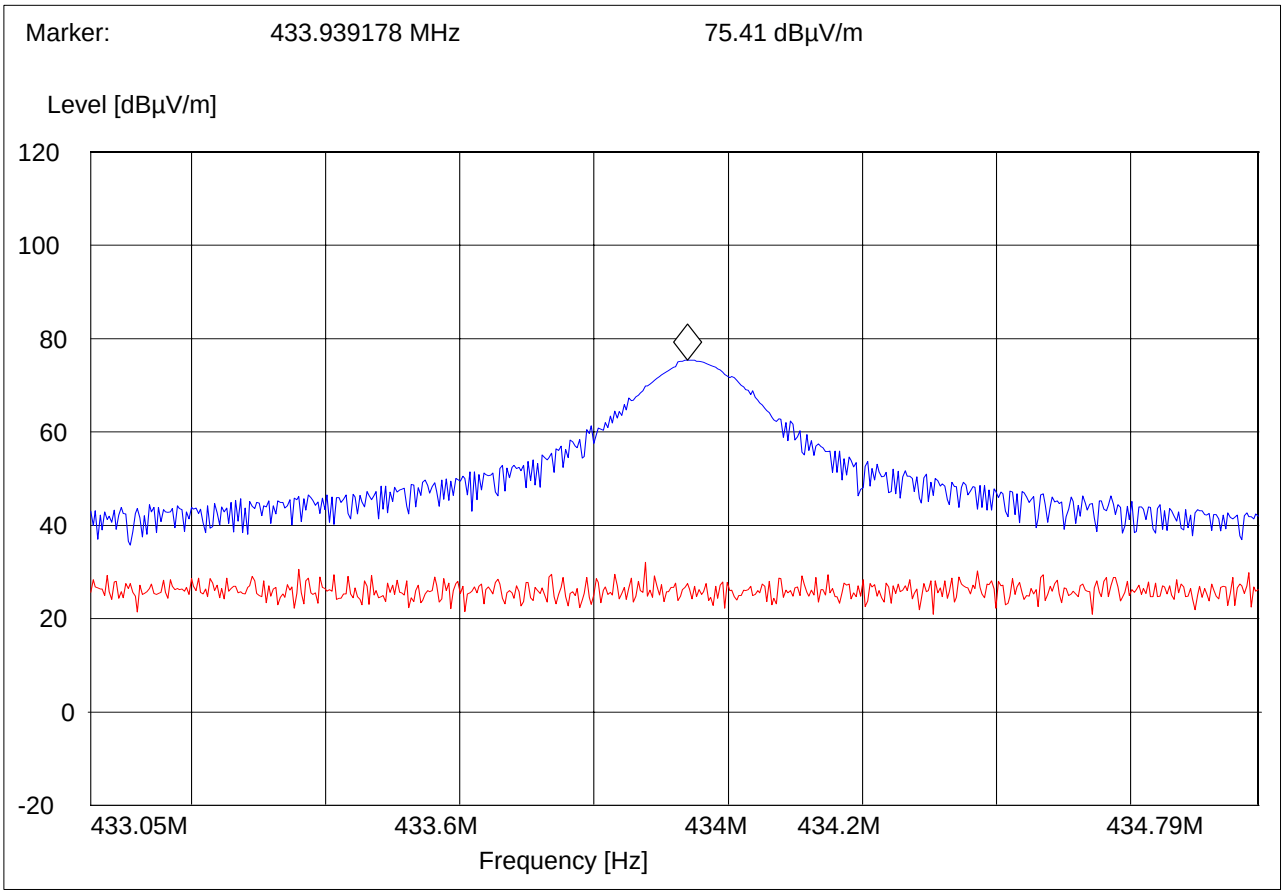


PLOT 5.2.4C
ANTENNA: VERTICAL / EUT: SIDE

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: V
EUT Orientation: Side
Test Engineer: Chris
Voltage: Battery
Comments: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.**

SWEEP TABLE: "FCC15.231_433M_Ver"

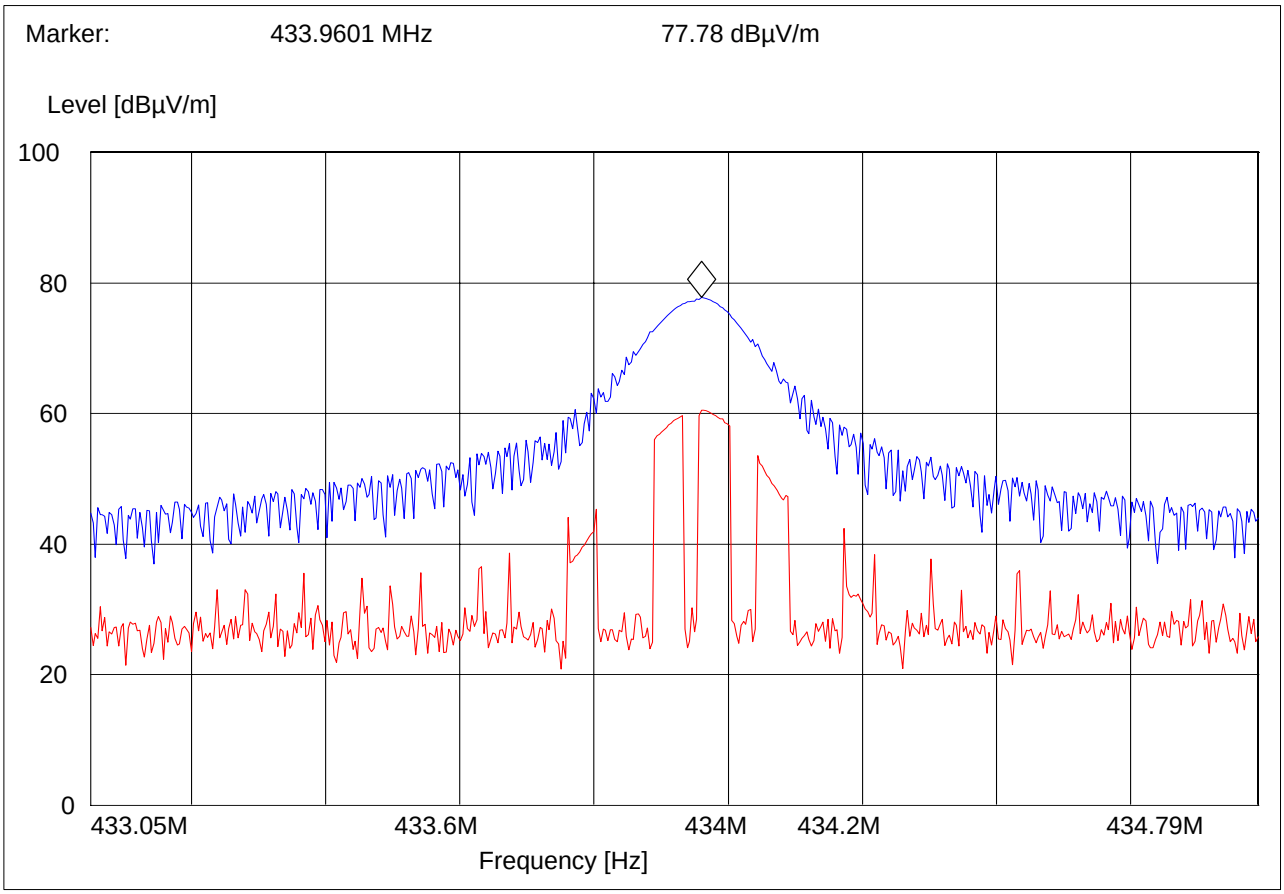
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
433.1 MHz	434.8 MHz	MaxPeak MaxPeak	Coupled	100 kHz	3141-#1186_Vert



PLOT 5.2.4D
ANTENNA: HORIZONTAL / EUT: VERTICAL

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: : H
EUT Orientation:: V
Test Engineer: Chris
Voltage: Car Battery
Comments:: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.**
SWEEP TABLE: "FCC15.231_433M_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
433.1 MHz	434.8 MHz	MaxPeak MaxPeak	Coupled	100 kHz	3141-#1186_Horz

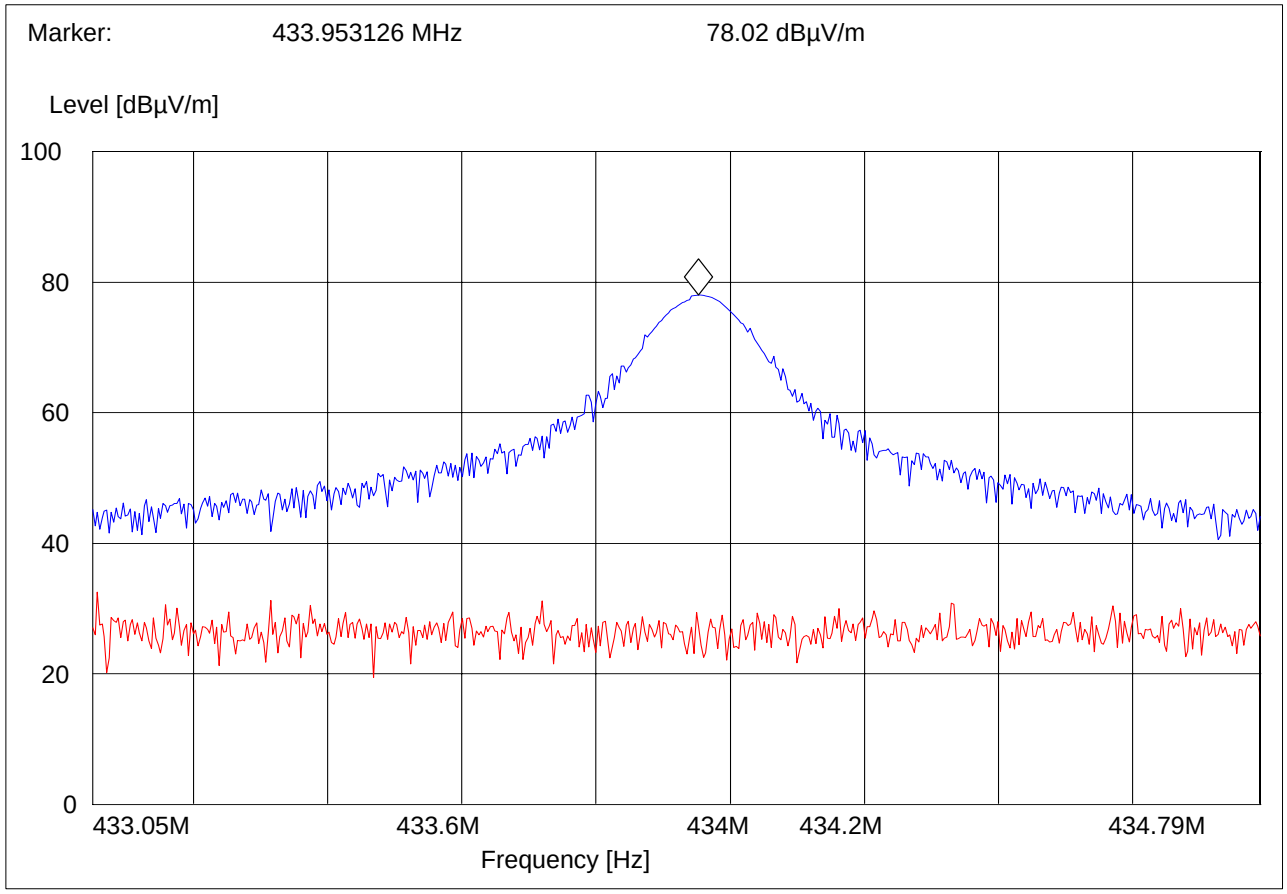


PLOT 5.2.4E
ANTENNA: HORIZONTAL / EUT: HORIZONTAL

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: : H
EUT Orientation:: H
Test Engineer: Chris
Voltage: Car Battery
Comments:: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.**

SWEEP TABLE: "FCC15.231_433M_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
433.1 MHz	434.8 MHz	MaxPeak MaxPeak	Coupled	100 kHz	3141-#1186_Horz

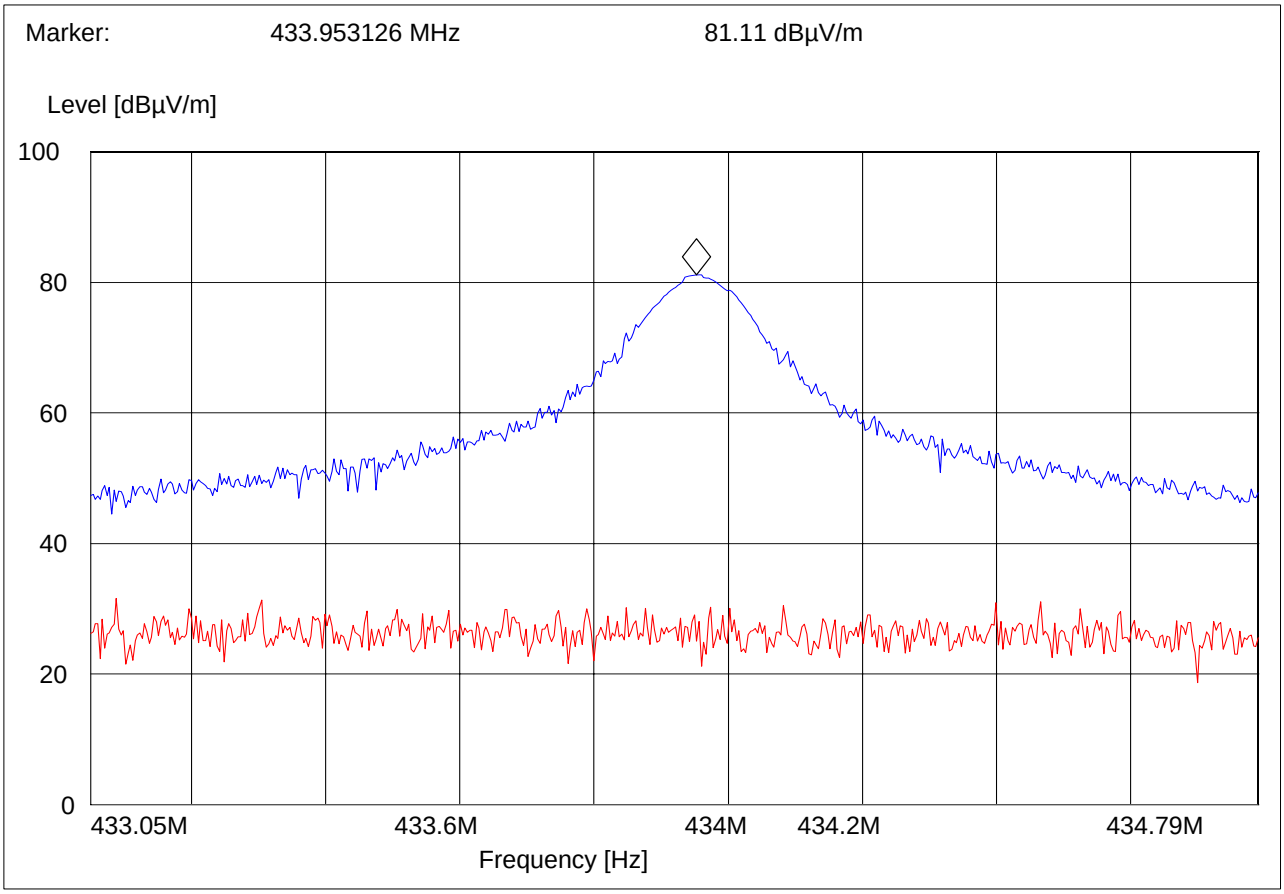


PLOT 5.2.4F
ANTENNA: HORIZONTAL / EUT: SIDE

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: : H
EUT Orientation:: Side
Test Engineer: Chris
Voltage: Car Battery
Comments:: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.** The measurements were made with a peak detector. They are converted into average values (because the limits are average limits) with this formula, 81.11+20log ((duty cycle/100))=81.11+20log((50/100))= 75.09dBµV/m.So the reading is below the limit.

SWEEP TABLE: "FCC15.231_433M_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
433.1 MHz	434.8 MHz	MaxPeak MaxPeak	Coupled	100 kHz	3141-#1186_Horz



5.3 Periodic operation characteristics

5.3.1 Periodic operation

5.3.1.1 Regulation

15.231 (a) The provisions of this Section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal.

5.3.1.2 Result

The equipment meets the requirements	n. a.

Further test results are attached	n. a.

5.3.2 Manually operated transmitter deactivation

5.3.2.1 Regulation

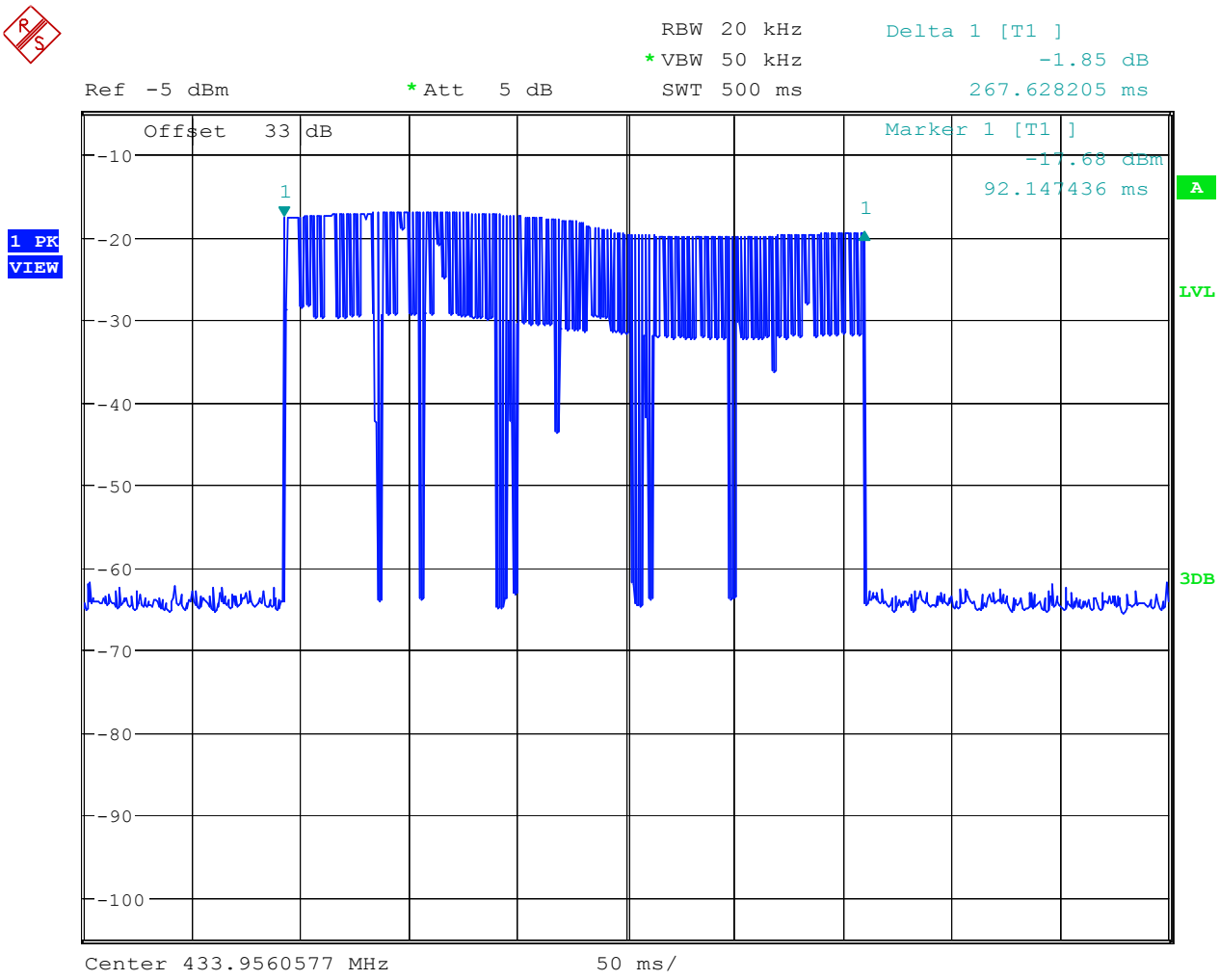
15.231 (a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.3.2.2 Result

The equipment meets the requirements	yes

Further test results are attached	yes

PLOT 5.3.2.2A



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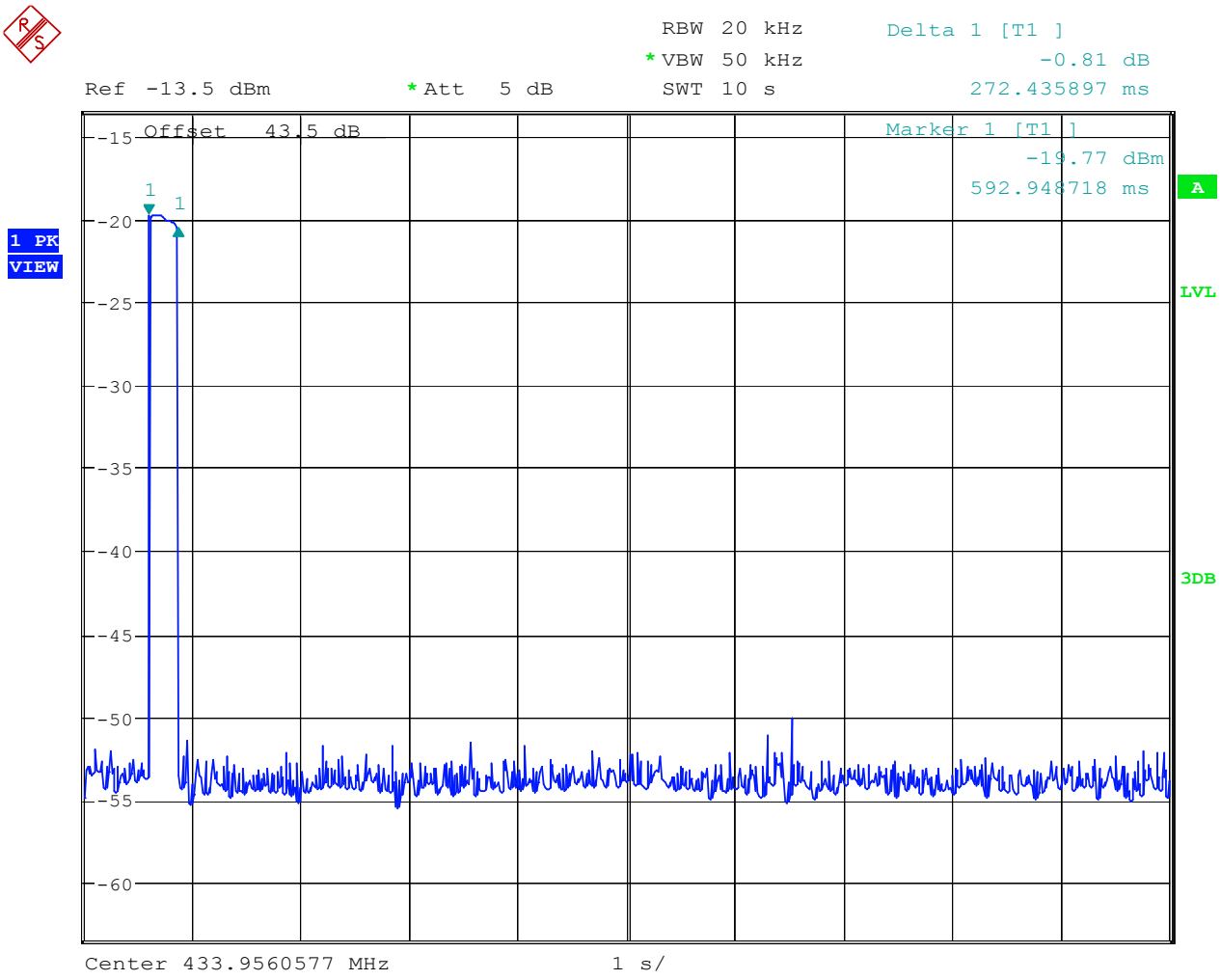
PLOT 5.3.2.2B



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5.3.3 Automatically operated transmitter deactivation

5.3.3.1 Regulation

15.231 (a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

5.3.3.2 Result

Device is manually operated.

The equipment meets the requirements	n. a.
Further test results are attached	n. a.

5.3.4 Prohibition of periodic transmission

5.3.4.1 Regulation

15.231(a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

5.3.4.2 Result

The equipment meets the requirements	n. a.

Further test results are attached	n. a.

5.3.5 Continuous transmission during an alarm condition

5.3.5.1 Regulation

15.231 (a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

5.3.5.2 Result

The equipment meets the requirements	n. a.

Further test results are attached	n. a.

5.4 Bandwidth

5.4.1 Regulation

15. 231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center 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 center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

5.4.2 Calculation of the 20dB bandwidth limit

The 20dB bandwidth limit=0.0025* 433.92 MHz = 1.0848 MHz

5.4.3 Test procedure

ANSI C63.4 Section 13.1.7

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or the first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical. Once the reference level is established, the equipment is conditioned with typical modulating signals to produce the worst-case (i.e., the widest) bandwidth. If no bandwidth requirement is specified by the procuring or regulatory agency, measure the bandwidth at –26 dB with respect to the reference level. In order to measure the modulated signal properly, a resolution bandwidth that is small compared with the bandwidth required by the procuring or regulatory agency shall be used on the measuring instrument. However, the resolution bandwidth of the measuring instrument shall be set to a value greater than 5% of the bandwidth requirements.

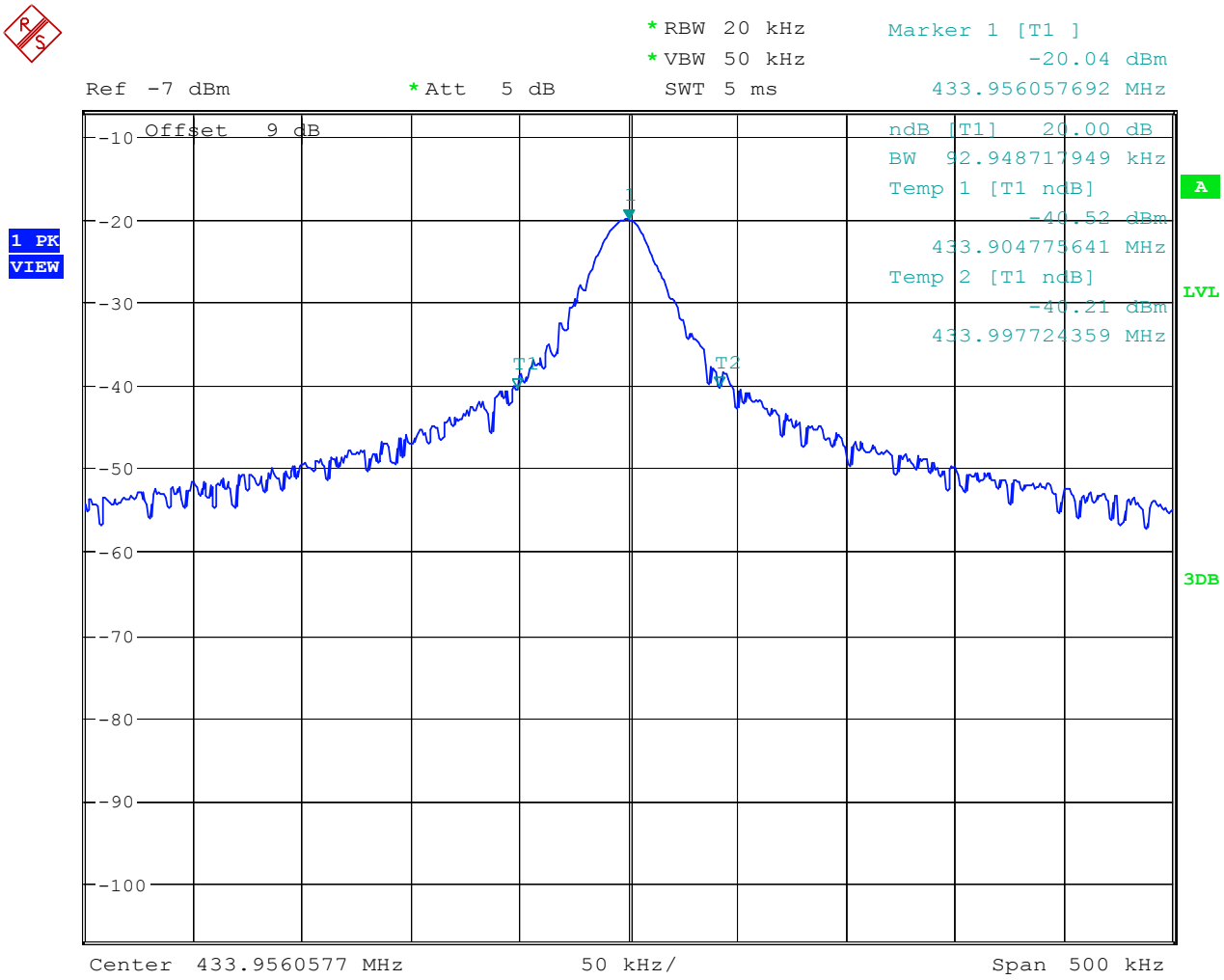
5.4.4 Test result

Value of measured 20 dB bandwidth	92.9487 kHz

The equipment meets the requirements	yes

Further test results are attached	yes

PLOT 5.4.4A



Date: 21.JAN.2009 17:09:59

5.5 Transmitter Radiated Spurious emissions : FCC 15.209/ RSS 210

(Measurement of the active transponder of the EUT)

Section 15.209 Radiated emission limits, general requirements.
(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

(c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

(d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

(e) The provisions in Sections 15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this Part.

(f) In accordance with Section 15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in Section 15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in Section 15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth

harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in Section 15.109 that are applicable to the incorporated digital device.

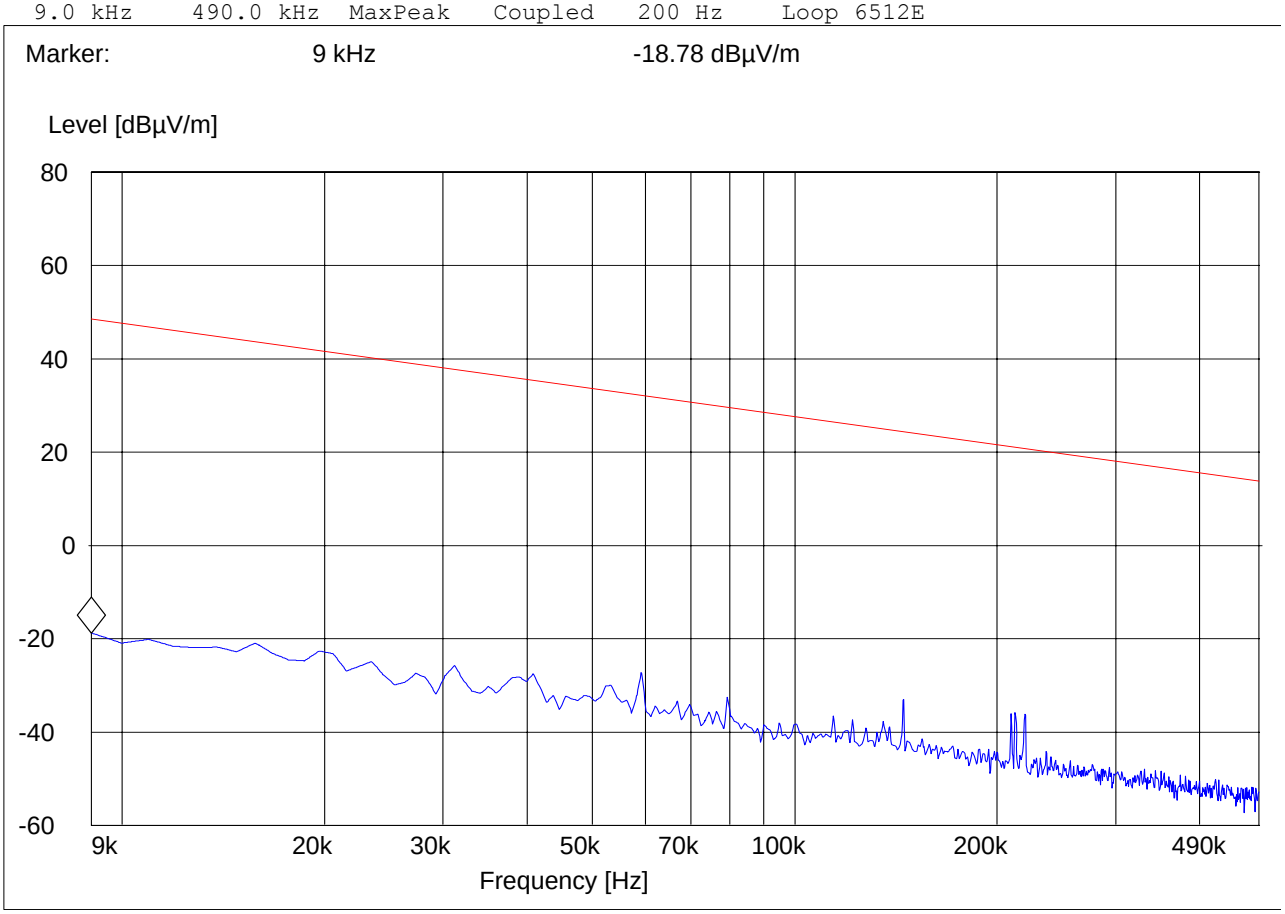
(g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.

PLOT 5.5A
9 kHz- 490 kHz

EUT: SPTU-1TX
Customer:: PasstimeUSA
Test Mode: 433 MHz TX
ANT Orientation: Loop
EUT Orientation: Side
Test Engineer: Josie
Voltage: Battery
Comments:

SWEEP TABLE: "FCC15.209<490k_Loop"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	490.0 kHz	MaxPeak	Coupled	200 Hz	Loop 6512E

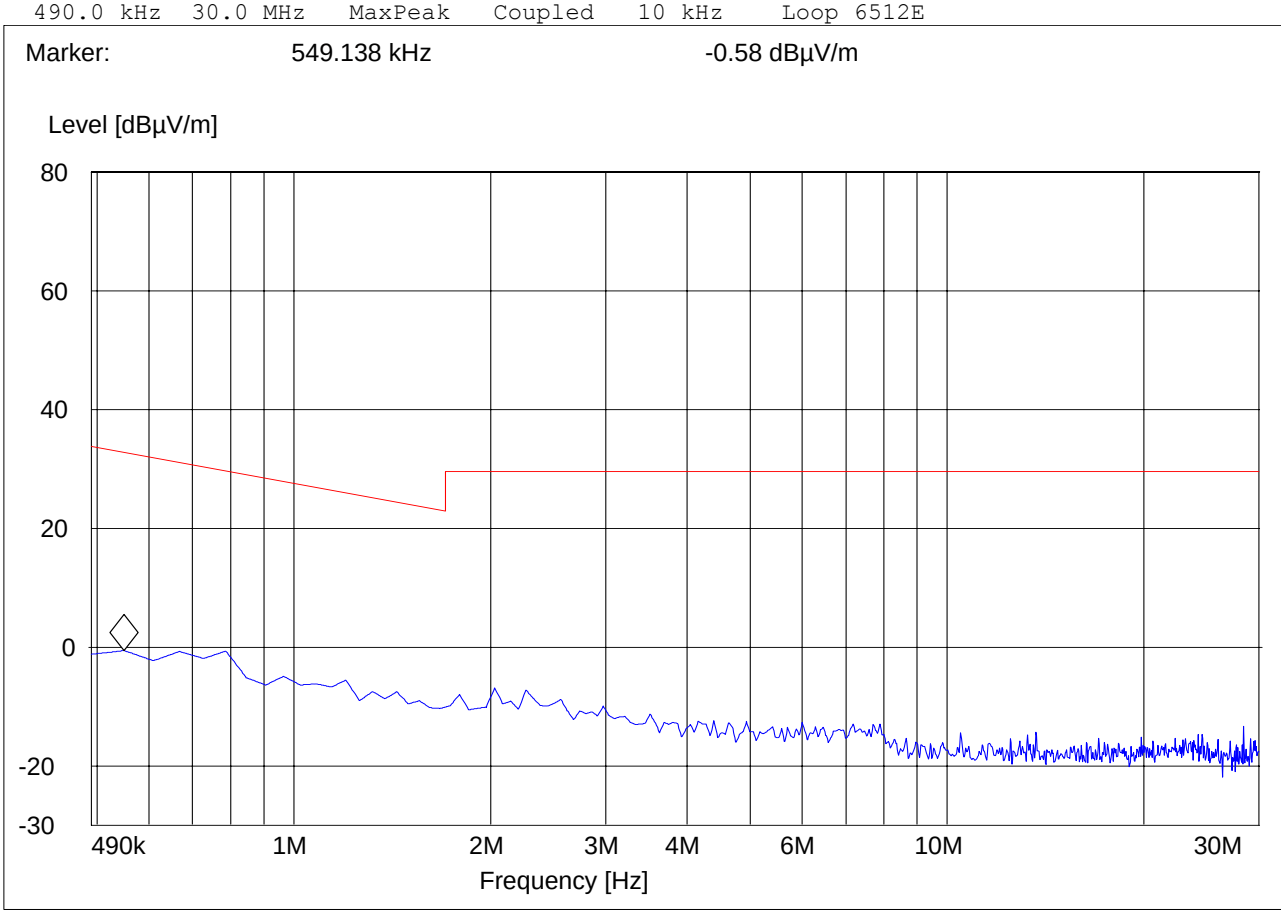


PLOT 5.5B
490kHz-30MHz

EUT: SPTU-1TX
Customer:: PasstimeUSA
Test Mode: 433 MHz TX
ANT Orientation: Loop
EUT Orientation: Side
Test Engineer: Josie
Voltage: Battery

SWEEP TABLE: "FCC15.209>490k_Loop"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
490.0 kHz	30.0 MHz	MaxPeak	Coupled	10 kHz	Loop 6512E

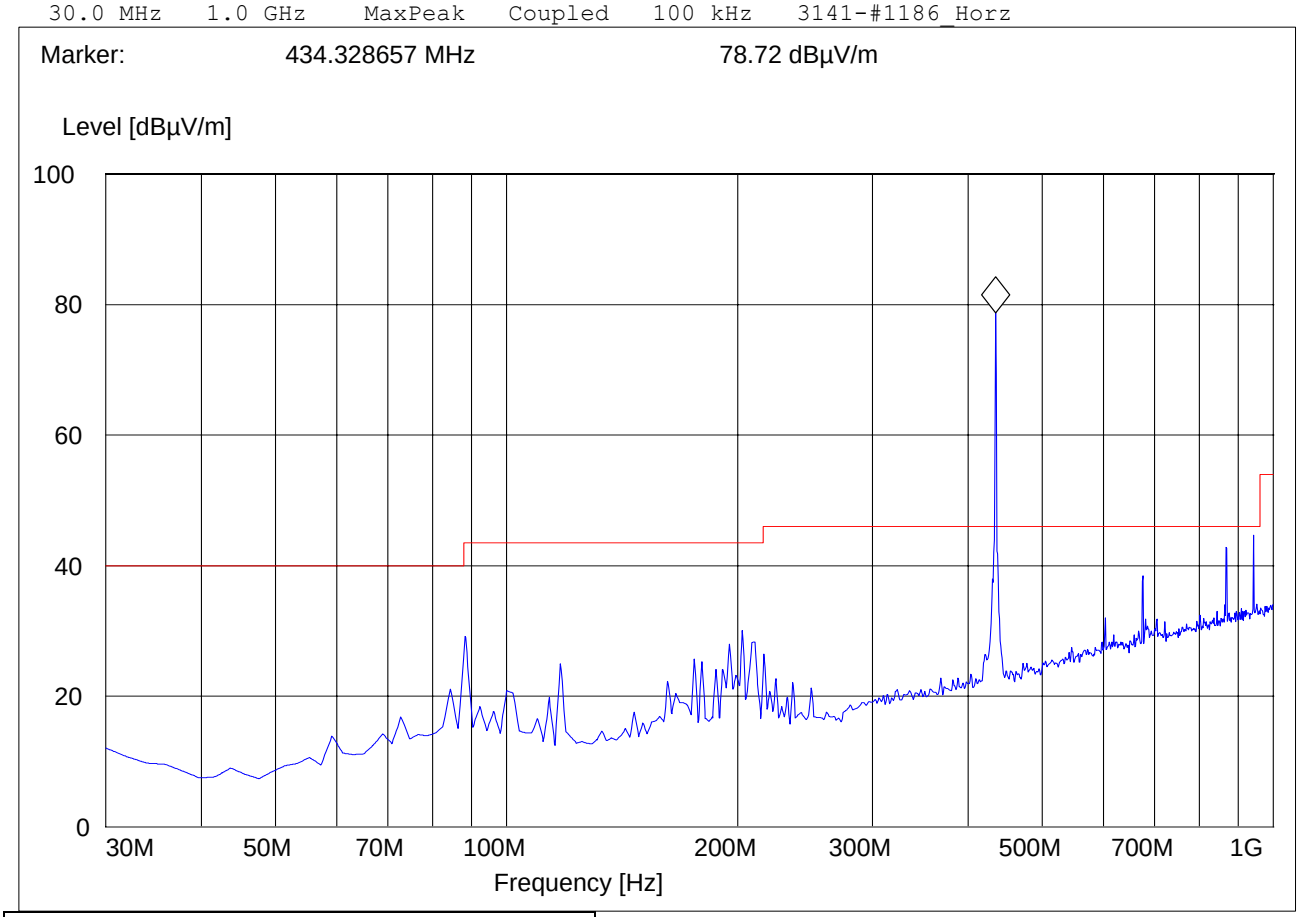


PLOT 5.5C
30 M-1G (Horizontal)(Worst Case)

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: H / EUT Orientation: Side
Voltage: Battery
Comments: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.** The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level. So this is **60.825 dBµV/m. So all peaks are below the limit.**

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



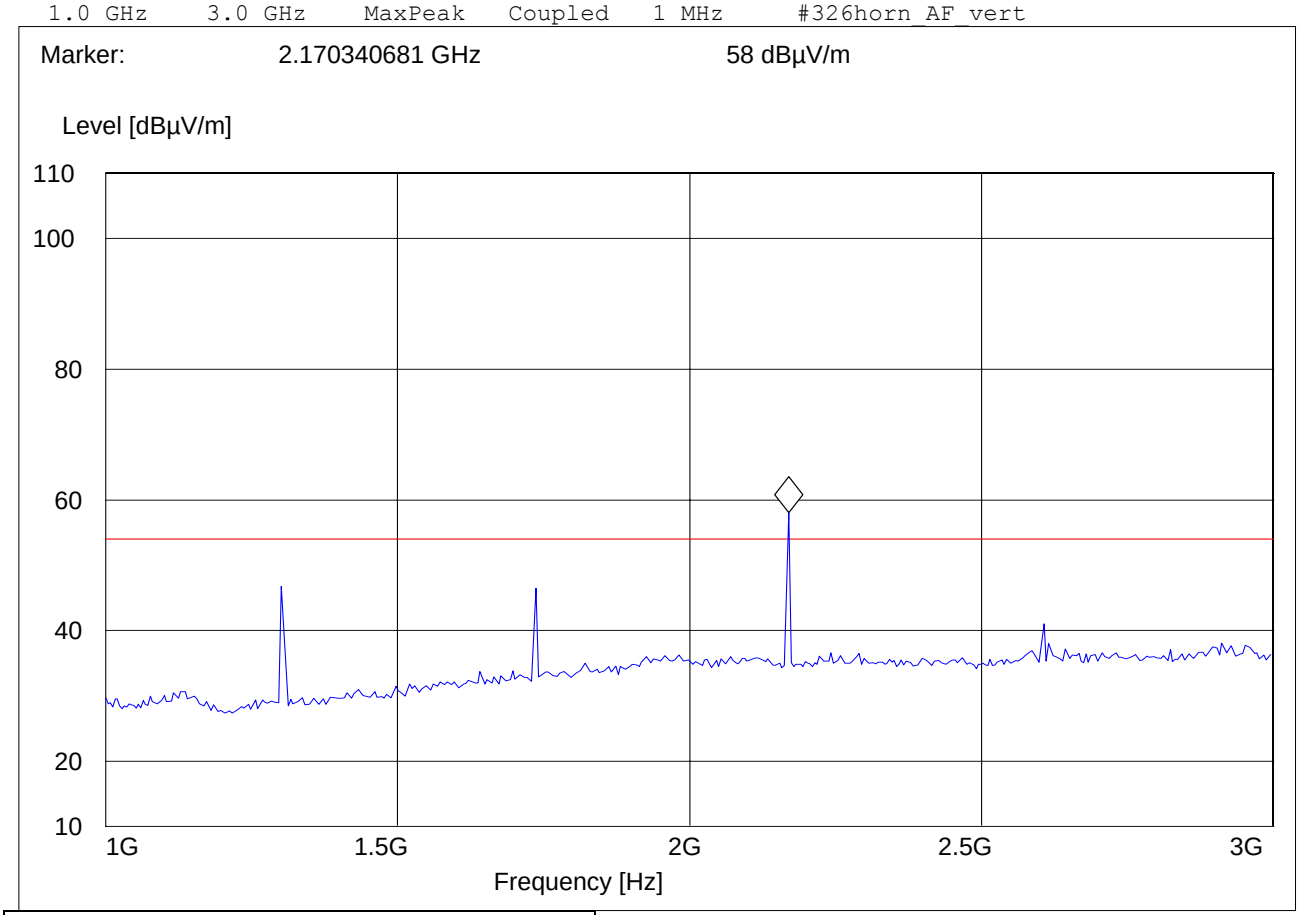
Peaks less than 20 dB from the limit		
No.	Frequency	Peak value
1	88.33 MHz	26.061 dBµV/m
2	203.2258 MHz	33.30 dBµV/m
3	604.167 MHz	31.7647 dBµV/m
4	675 MHz	38.2353 dBµV/m
5	866.67 MHz	42.941 dBµV/m
6	943.75 MHz	45.14285 dBµV/m

PLOT 5.5D
1-3G

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: H
EUT Orientation: Side
Test Engineer: Chris
Voltage: Battery
Comments: According to FCC 15.231(b), Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:for the band 260-470 MHz, µV/m at 3 meters = 41.6667(F) - 7083.3333 is the limit. Since the fundamental frequency is 433.92 MHz, the limit is 41.6667(433.92) - 7083.3333=10996.68 µV/m= **80.825 dBµV/m.** The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level. So this is **60.825 dBµV/m. So all peaks are below the limit.**

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



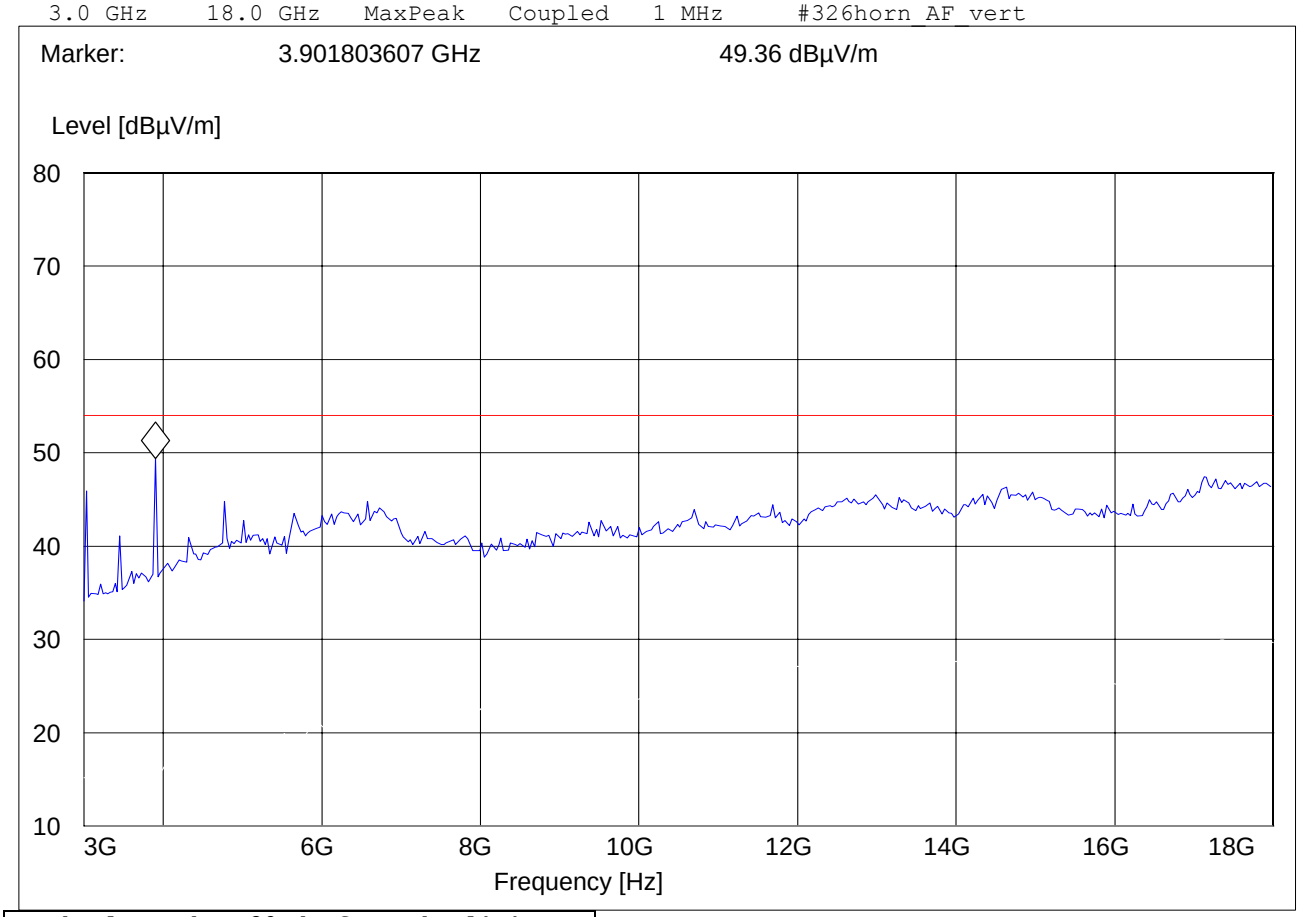
Peaks less than 20 dB from the limit		
No.	Frequency	Peak value
1	1301.76 MHz	46.45 dBµV/m
2	1735.68 MHz	46.4516 dBµV/m
3	2603.52 MHz	40.6451 dBµV/m
4	2615.942 MHz	38.06 dBµV/m
5	2913.043 MHz	38.0647 dBµV/m
6	2826.0869 MHz	36.875 dBµV/m

PLOT 5.5E
3-18 G

EUT: SPTU-1TX
Customer:: PASSTIME USA
Test Mode: 433.92 MHz TX
ANT Orientation: H
EUT Orientation: Side
Test Engineer: Chris
Voltage: Battery

SWEEP TABLE: "FCC15.247_3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



Peaks less than 20 dB from the limit		
No.	Frequency	Peak value
1	3037.44 MHz	47.2727 dBµV/m
2	3471.36 MHz	40.9090 dBµV/m
3	4339.2 MHz	40.9090 dBµV/m
4	4773.12 MHz	44.545 dBµV/m
5	5027.03 MHz	42.727 dBµV/m
6	3901.80361 MHz	49.36 dBµV/m

5.6 RECEIVER RADIATED EMISSIONS § 2.1053 / RSS-210

Limits **SUBCLAUSE § RSS-210**

Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watt, e.i.r.p)	
	Transmitters	Receivers
30-88	100(3nW)	100(3nW)
88-216	150(6.8nW)	150(6.8nW)
216-960	200(12nW)	200(12nW)
Above 960	500(75 nW)	500(75 nW)

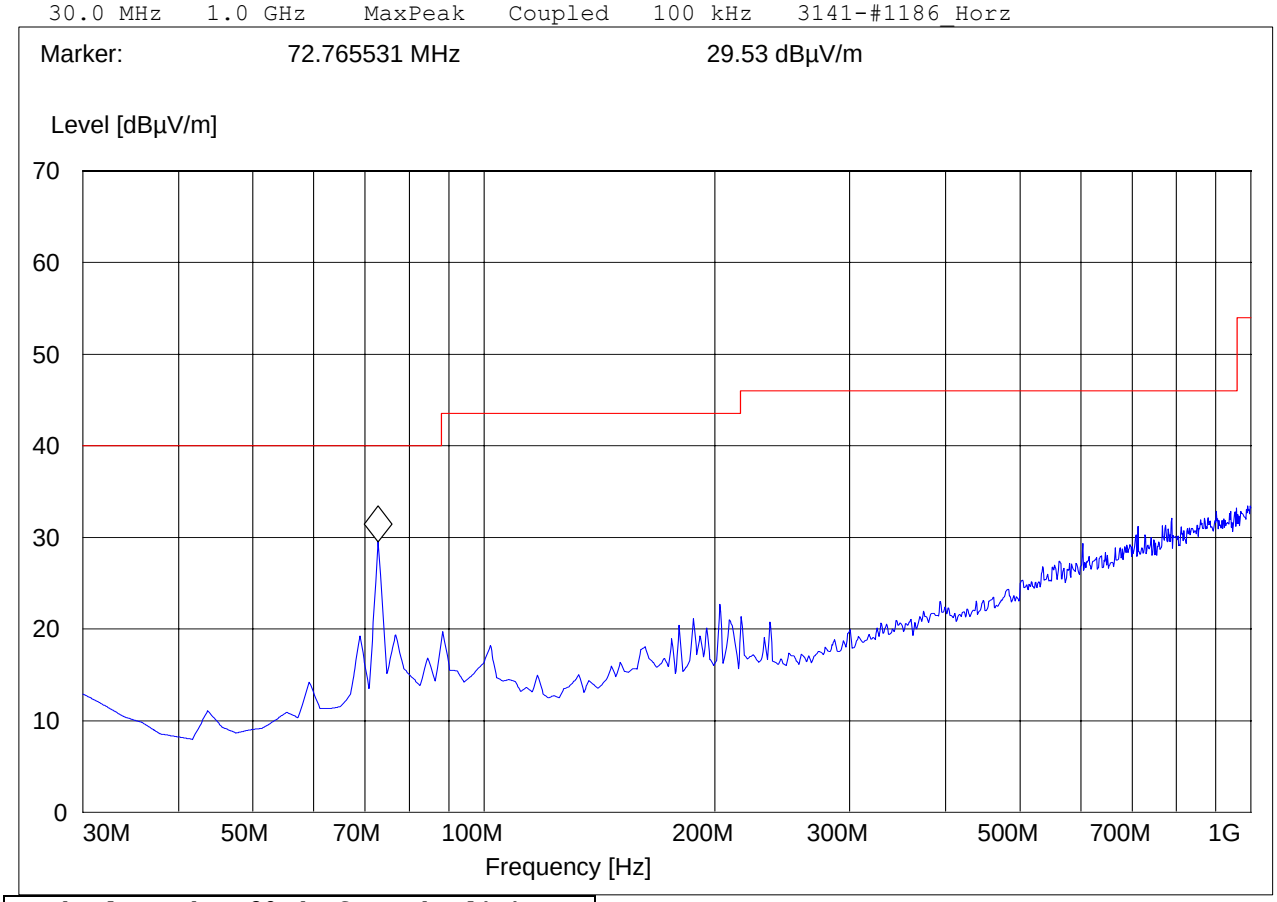
PLOT 5.6. A

EUT in Idle Mode: 30MHz – 1GHz
Antenna: horizontal
Note: Peak Reading Vs. Quasi-Peak Limit.

EUT: SPTU-1TX
Customer:: PasstimeUSA
Test Mode: 433 MHz RX
ANT Orientation: H
EUT Orientation: Side
Test Engineer: Satya
Voltage: Battery

SWEEP TABLE: "CANDA RE_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



Peaks less than 20 dB from the limit		
No.	Frequency	Peak value
1	712.30	31.21 dBµV/m
2	727.8557	30.27 dBµV/m
3	766.73346	31.30 dBµV/m
4	788.116232	31.70 dBµV/m
5	900.86172	32.88 dBµV/m
6	941.68336	32.68 dBµV/m

PLOT 5.6 B

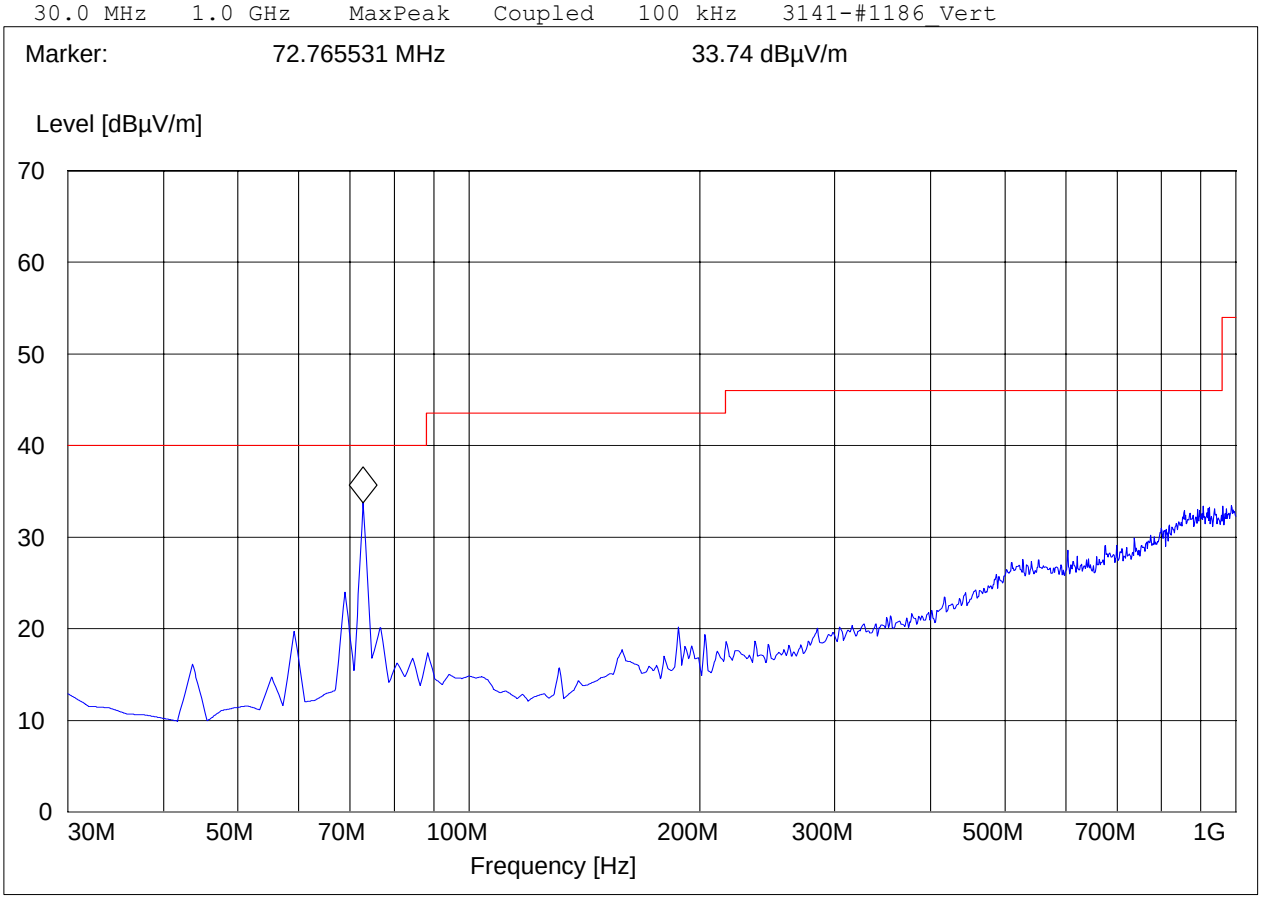
EUT in Idle Mode: 30MHz – 1GHz

Antenna: vertical

EUT: SPTU-1TX
Customer:: PasstimeUSA
Test Mode: 433 MHz RX
ANT Orientation: V
EUT Orientation: Side
Test Engineer: Satya
Voltage: Battery

SWEEP TABLE: "CANADA RE_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



Peaks less than 20 dB from the limit		
No.	Frequency	Peak value
1	68.877756 MHz	23.99 dBµV/m
2	72.765531 MHz	33.74 dBµV/m
3	76.65330 MHz	20.13 dBµV/m
4	856.15230 MHz	32.70 dBµV/m
5	906.69338 MHz	33.36 dBµV/m
6	924.188377 MHz	33.29 dBµV/m

PLOT 5.6 C

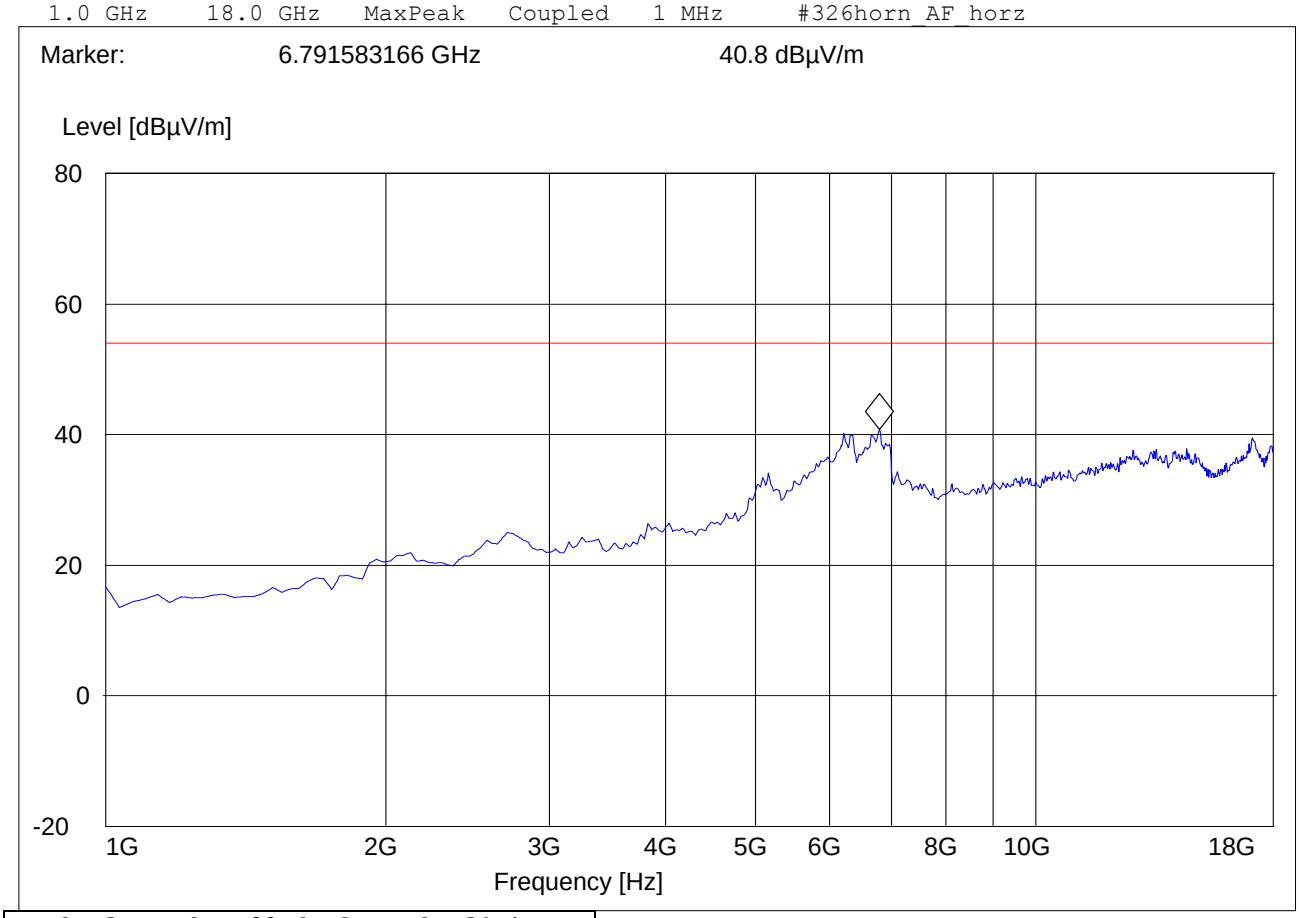
EUT in Idle Mode: 1GHz – 18GHz

Note: Peak Reading Vs. Average Limit.

EUT: SPTU-1TX
Customer:: PasstimeUSA
Test Mode: 433 MHz RX
ANT Orientation: H
EUT Orientation: Side
Test Engineer: Satya
Voltage: Battery

SWEEP TABLE: "CANADA RE_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



Peaks less than 20 dB from the limit		
No.	Frequency	Peak value
1	6.31 GHz	40.1 dBµV/m
2	6.3333 GHz	40 dBµV/m
3	6.6893 GHz	40 dBµV/m
4	6.791583166 GHz	40.8 dBµV/m
5	17145.63 GHz	38.27 dBµV/m
6	17300.97 GHz	39.31 dBµV/m

6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2009	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	May 2009	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2009	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2009	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2009	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
14	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2009	1 year
15	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2009	1 year
16	Loop Antenna	6512	EMCO	00049838	July 2010	2 years

7 References

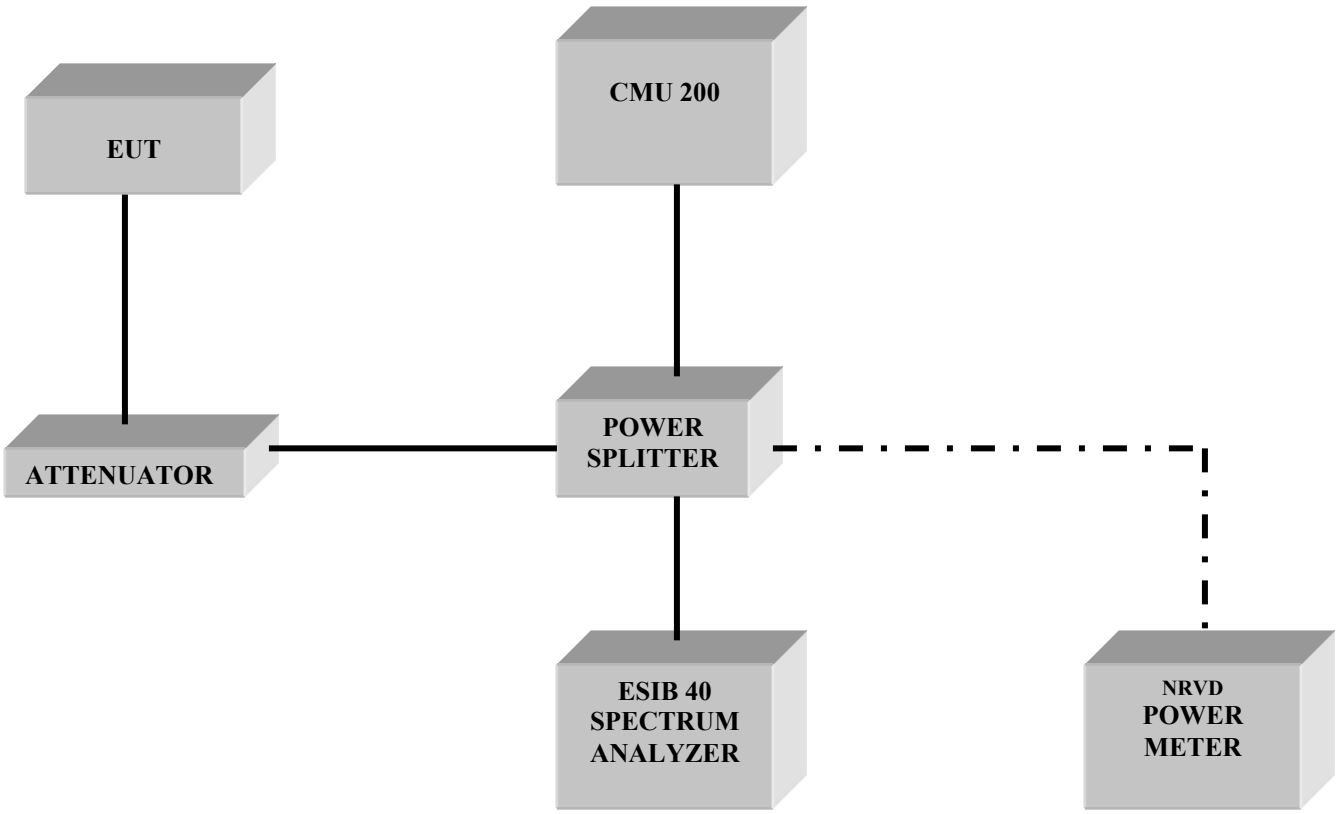
Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,
PART 15--RADIO FREQUENCY DEVICES September 20, 2007.

ANSI C63.4: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz 30th January, 2004

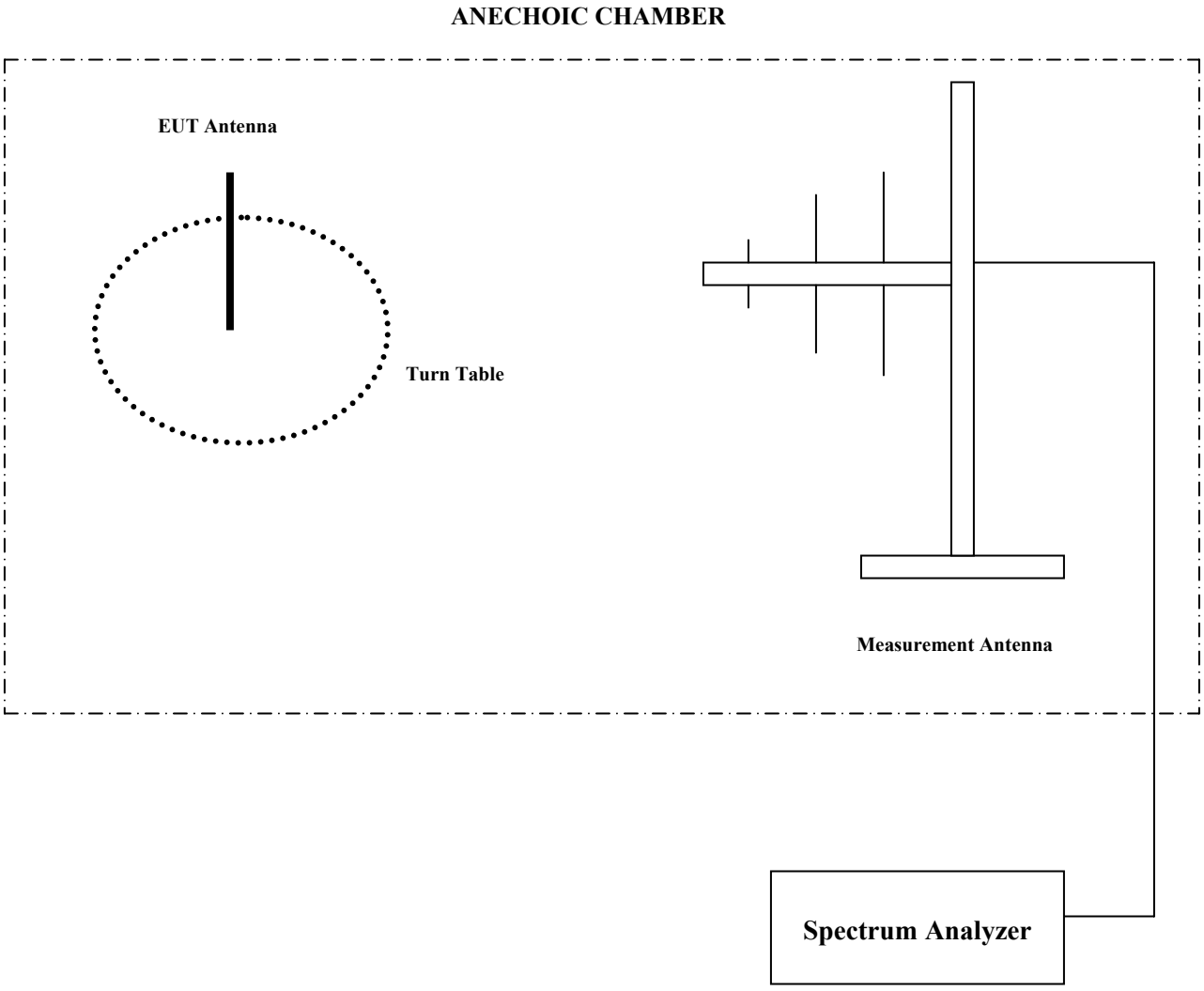
RSS-210 Low-power License-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

8 BLOCK DIAGRAMS

Conducted Testing



Radiated Testing



9 Revision History

2009-02-17: EMC_ PASST_001_08001_FCC15.231_SPTU1TX: Original report

2009-02-18: EMC_ PASST_001_08001_FCC15.231_SPTU1: Report modified to include the receiver as part of the Vehicle Starter Interrupt System.

2009-02-27: EMC_ PASST_001_08001_FCC15.231_SPTU1_rev1:

a. Limits used in receiver radiated sweeps changed

b. Receiver radiated plots below 30 MHz removed

c. Plot in section 5.3.3 removed

d. Plot 5.4.4a changed.

2009-03-11: EMC_ PASST_001_08001_FCC15.231_SPTU1_rev2:

a. Plot 5.6c changed.

2009-03-16: EMC_ PASST_001_08001_FCC15.231_SPTU1_rev3

a. Test equipment table updated.
b. Separate model names issued for RF remote model name: SPTU-1TX and RF receiver model name: SPTU-1