

FCC Test Report

Product Name	Broadcast Transponder
Model No.	i-B350L CC
FCC ID	OO4-ILR-IB350LCC

Applicant	Identec Solutions AG
Address	Millenium Park 2, 6890 Lustenau, Austria

Date of Receipt	Jul. 11, 2019
Issued Date	Aug. 26, 2019
Report No.	1970207R-RFUSP66V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Aug. 26, 2019

Report No.: 1970207R-RFUSP66V00



Product Name	Broadcast Transponder
Applicant	Identec Solutions AG
Address	Millenium Park 2, 6890 Lustenau, Austria
Manufacturer	Identec Solutions AG
Model No.	i-B350L CC
EUT Rated Voltage	DC 3V(Power by Battery)
EUT Test Voltage	DC 3V(Power by Battery)
Trade Name	IDENTEC SOLUTIONS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2018 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



(Adm. Specialist / Vita Wang)

Tested By :



(Engineer / Yunche Chen)

Approved By :



(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Broadcast Transponder
Trade Name	IDENTEC SOLUTIONS
Model No.	i-B350L CC
FCC ID	OO4-ILR-IB350LCC
Frequency Range	918 MHz – 924.5MHz
Channel Control	Auto
Type of Modulation	FSK
Antenna Type	PCB Antenna

Emission	
Performed Item	Test
Conducted Emission	Not performed (see note)
Radiated Emission	Pass
Band Edge	Pass

Note: Owing to the Battery operation of EUT, this Conducted Emission is not performed.

Center Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	918 MHz	Channel 20:	920 MHz	Channel 40:	922 MHz	Channel 60:	924 MHz
Channel 01:	918.1 MHz	Channel 21:	920.1 MHz	Channel 41:	922.1 MHz	Channel 61:	924.1 MHz
Channel 02:	918.2 MHz	Channel 22:	920.2 MHz	Channel 42:	922.2 MHz	Channel 62:	924.2 MHz
Channel 03:	918.3 MHz	Channel 23:	920.3 MHz	Channel 43:	922.3 MHz	Channel 63:	924.3 MHz
Channel 04:	918.4 MHz	Channel 24:	920.4 MHz	Channel 44:	922.4 MHz	Channel 64:	924.4 MHz
Channel 05:	918.5 MHz	Channel 25:	920.5 MHz	Channel 45:	922.5 MHz	Channel 65:	924.5 MHz
Channel 06:	918.6 MHz	Channel 26:	920.6 MHz	Channel 46:	922.6 MHz		
Channel 07:	918.7 MHz	Channel 27:	920.7 MHz	Channel 47:	922.7 MHz		
Channel 08:	918.8 MHz	Channel 28:	920.8 MHz	Channel 48:	922.8 MHz		
Channel 09:	918.9 MHz	Channel 29:	920.9 MHz	Channel 49:	922.9 MHz		
Channel 10:	919 MHz	Channel 30:	921 MHz	Channel 50:	923 MHz		
Channel 11:	919.1 MHz	Channel 31:	921.1 MHz	Channel 51:	923.1 MHz		
Channel 12:	919.2 MHz	Channel 32:	921.2 MHz	Channel 52:	923.2 MHz		
Channel 13:	919.3 MHz	Channel 33:	921.3 MHz	Channel 53:	923.3 MHz		
Channel 14:	919.4 MHz	Channel 34:	921.4 MHz	Channel 54:	923.4 MHz		
Channel 15:	919.5 MHz	Channel 35:	921.5 MHz	Channel 55:	923.5 MHz		
Channel 16:	919.6 MHz	Channel 36:	921.6 MHz	Channel 56:	923.6 MHz		
Channel 17:	919.7 MHz	Channel 37:	921.7 MHz	Channel 57:	923.7 MHz		
Channel 18:	919.8 MHz	Channel 38:	921.8 MHz	Channel 58:	923.8 MHz		
Channel 19:	919.9 MHz	Channel 39:	921.9 MHz	Channel 59:	923.9 MHz		

Note:

1. The EUT is a Broadcast Transponder with a built-in RFID transceiver.
2. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit
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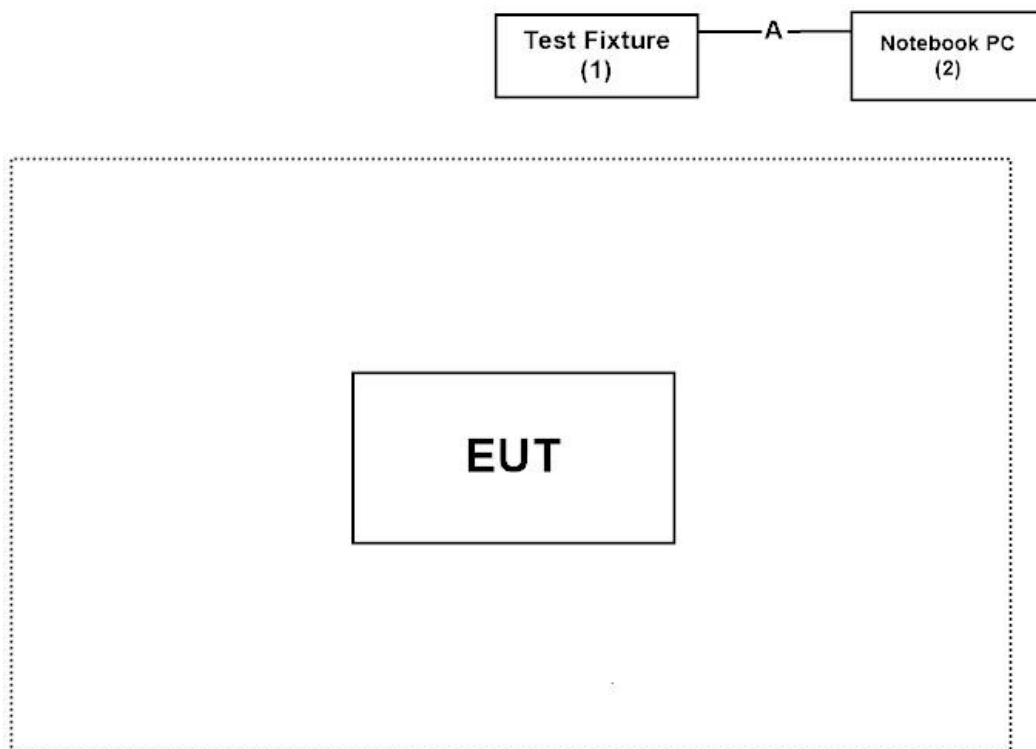
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Test Fixture	IDENTEC SOLUTIONS	N/A	N/A	N/A
2 Notebook PC	DELL	Latitude 5491	1PL56S2	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A USB Cable	Non-Shielded, 1.7m

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute “Gen3 Tag Certification tool v 1.0.0.19930” program on the Notebook.
- (3) Configure the test mode and the test channel
- (4) Start the continuous Transmit.
- (5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

USA : FCC Registration Number: TW3023

Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: <http://www.dekra.com.tw>

1.7. List of Test Equipment

For Conducted measurements /SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2019/02/12	2020/02/11
	Spectrum Analyzer	Agilent	N9010A	MY48030495	2018/10/13	2019/10/12
	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/19	2020/07/18
	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/06	2020/07/05
	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/06	2020/07/05
	EMI Test Receiver	R&S	ESCS 30	100369	2018/11/07	2019/11/06
	LISN	R&S	ESH3-Z5	836679/017	2019/02/09	2020/02/08
	LISN	R&S	ENV216	100097	2019/02/09	2020/02/08
	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/22	2020/06/21

For Radiated measurements /Site3/CB8

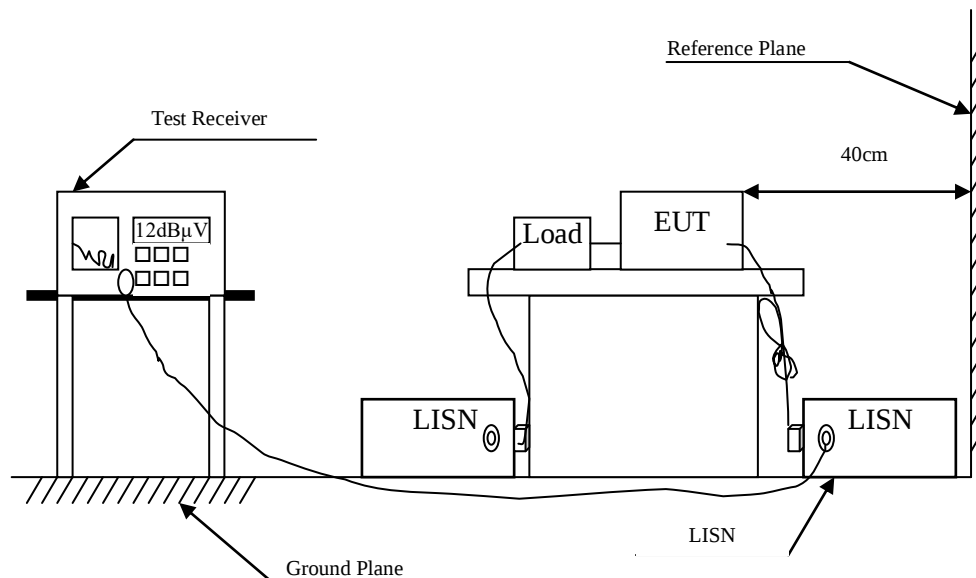
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2019/03/12	2020/03/11
X	Loop Antenna	Teseq	HLA6121	37133	2018/10/13	2019/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2019/06/25	2020/06/24
X	Coaxial Cable	DEKRA	RG 214	LC003-RG	2019/06/15	2020/06/14
X	Pre-Amplifier	Jet-Power	JPA-10M1G33	170101000330010	2019/07/19	2020/07/18
X	Horn Antenna	ETS-Lindgren	3117	00135205	2019/05/03	2020/05/02
X	Pre-Amplifier	EMCI	EMC012630SE	980210	2019/04/10	2020/04/09
X	Coaxial Cable	QuieTek	SF-106	LC035/37/41-SF	2019/06/21	2020/06/20
	Amplifier + Cable	EMCI	EMC184045SE	980370	2019/03/21	2020/03/20
	Horn Antenna	Com-Power	AH-840	101043	2019/01/09	2020/01/08
	Filter	MicroTRON	BRM50701	019	2018/11/21	2019/11/20
	Filter	Microwave Circuits	N0257881	36681	2019/01/22	2020/01/21

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version :QuieTek EMI 2.0 V2.1.113.

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Uncertainty

± 2.26 dB

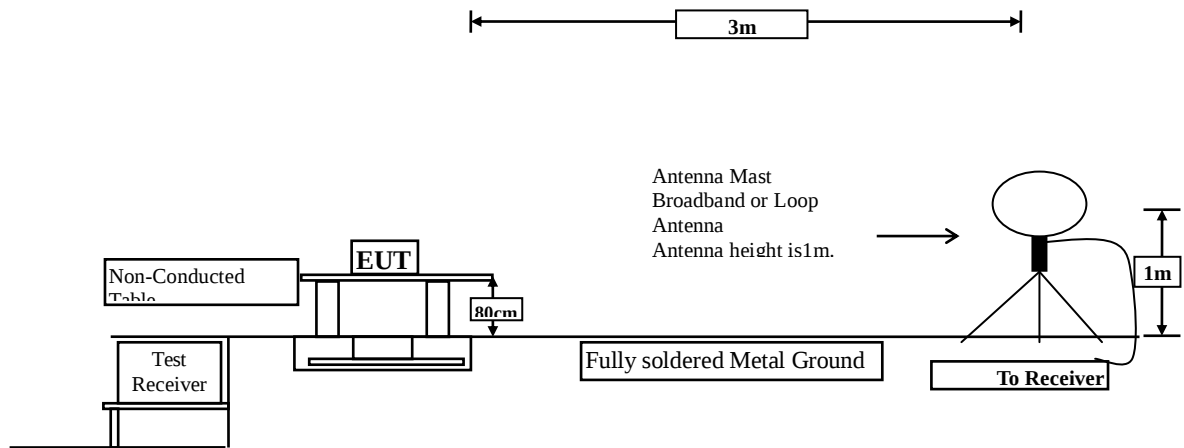
2.5. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.

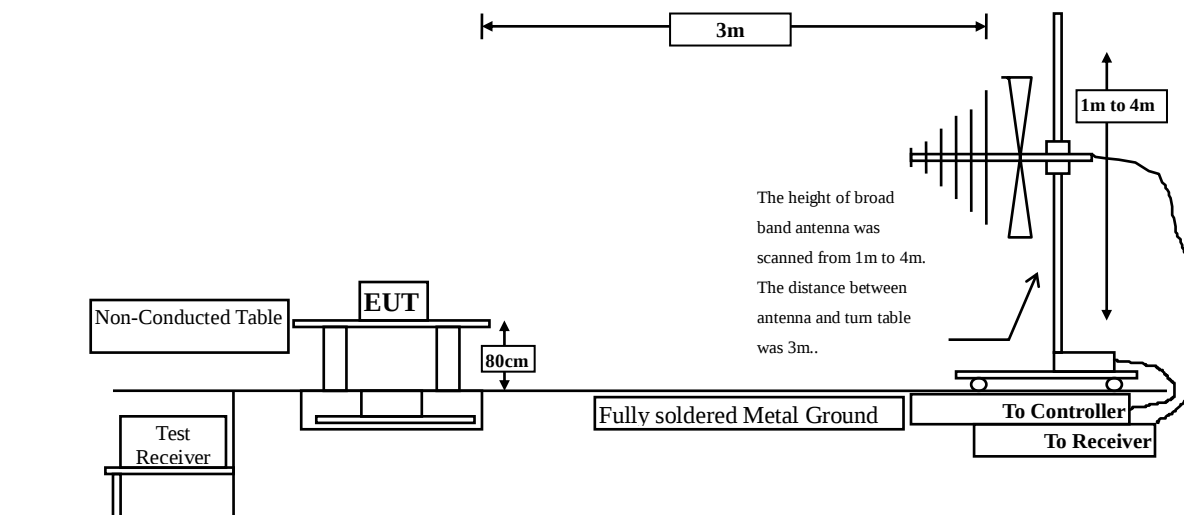
3. Radiated Emission

3.1. Test Setup

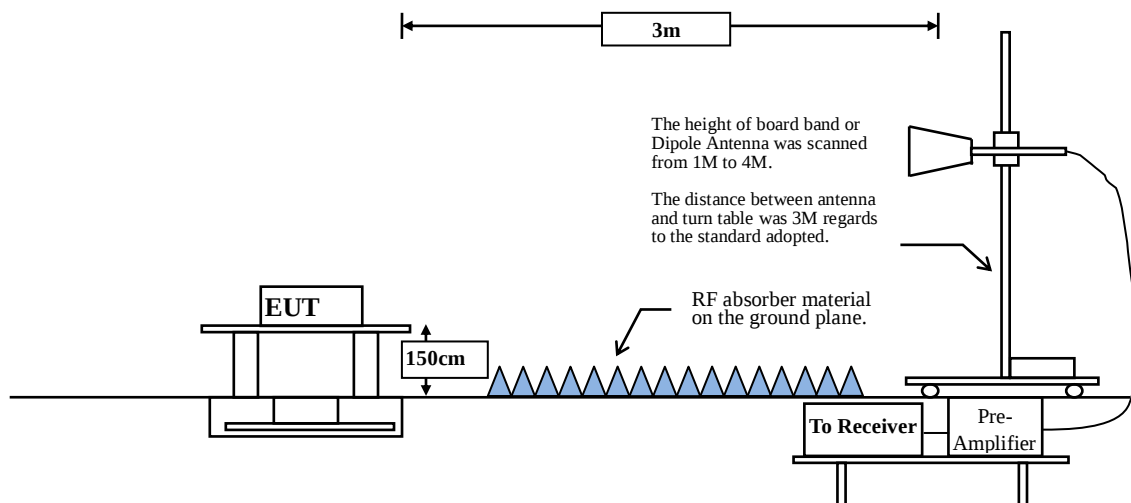
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBμV /m @3m)	(uV/m @3m)	(dBμV /m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dBμV /m) = 20 log RF Voltage (uV/m)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

3.4. Uncertainty

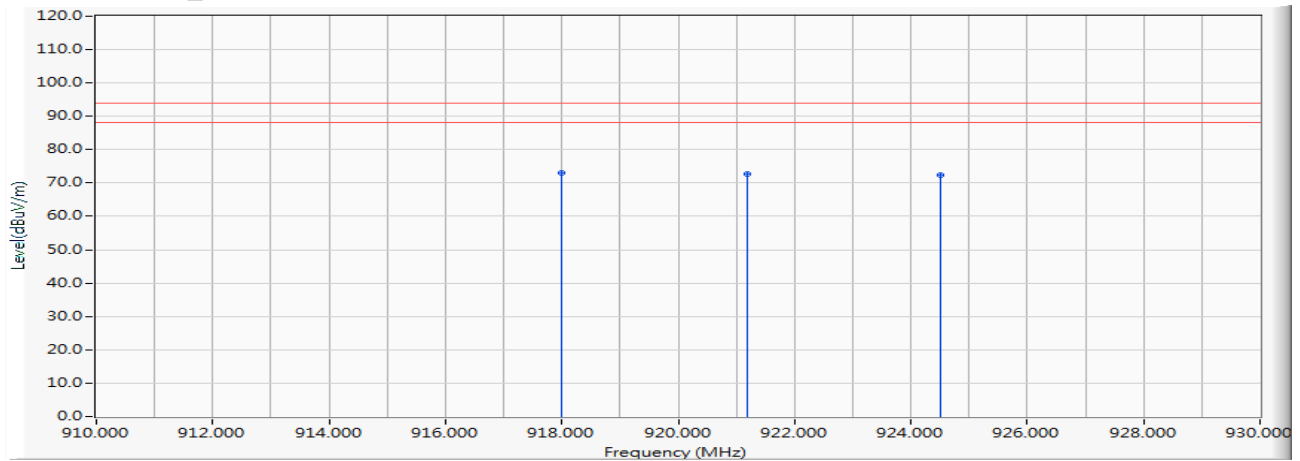
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

3.5. Test Result of Radiated Emission

Product : Broadcast Transponder
 Test Item : Fundamental Radiated Emission
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit

HORIZONTAL_X-Axis

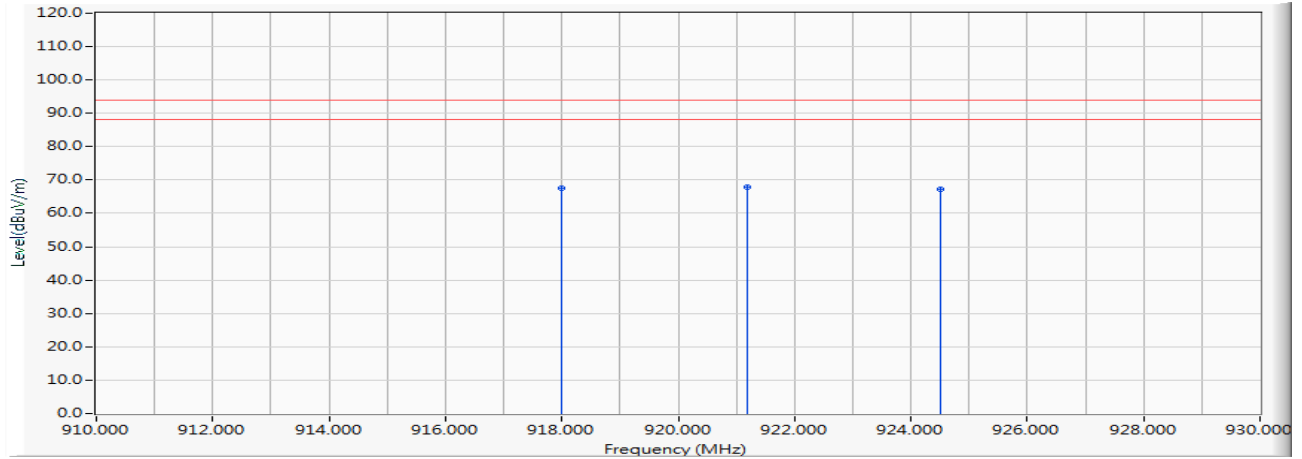


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	918.000	-10.193	83.290	73.097	-20.903	94.000	QUASIPeAK
2		921.200	-10.147	82.790	72.643	-21.357	94.000	QUASIPeAK
3		924.500	-9.905	82.250	72.345	-21.655	94.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Fundamental Radiated Emission
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit

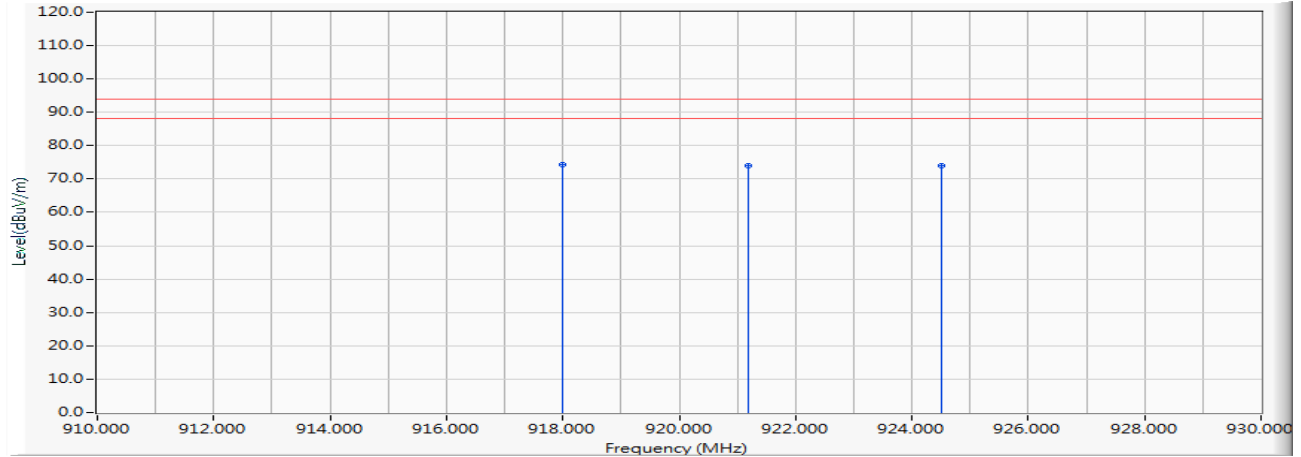
VERTICAL_X-Axis

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		918.000	-10.193	77.870	67.677	-26.323	94.000	QUASIPeAK
2	*	921.200	-10.147	78.000	67.853	-26.147	94.000	QUASIPeAK
3		924.500	-9.905	77.150	67.245	-26.755	94.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Fundamental Radiated Emission
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit

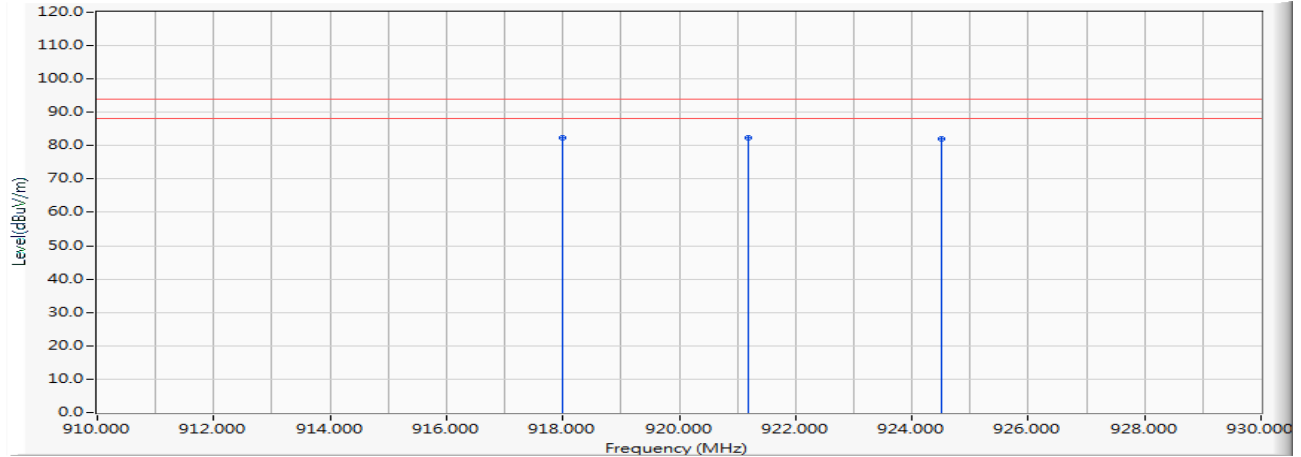
HORIZONTAL_Y-Axis

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	918.000	-10.193	84.660	74.467	-19.533	94.000	QUASIPeAK
2		921.200	-10.147	84.250	74.103	-19.897	94.000	QUASIPeAK
3		924.500	-9.905	84.020	74.115	-19.885	94.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Fundamental Radiated Emission
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit

VERTICAL_Y-Axis

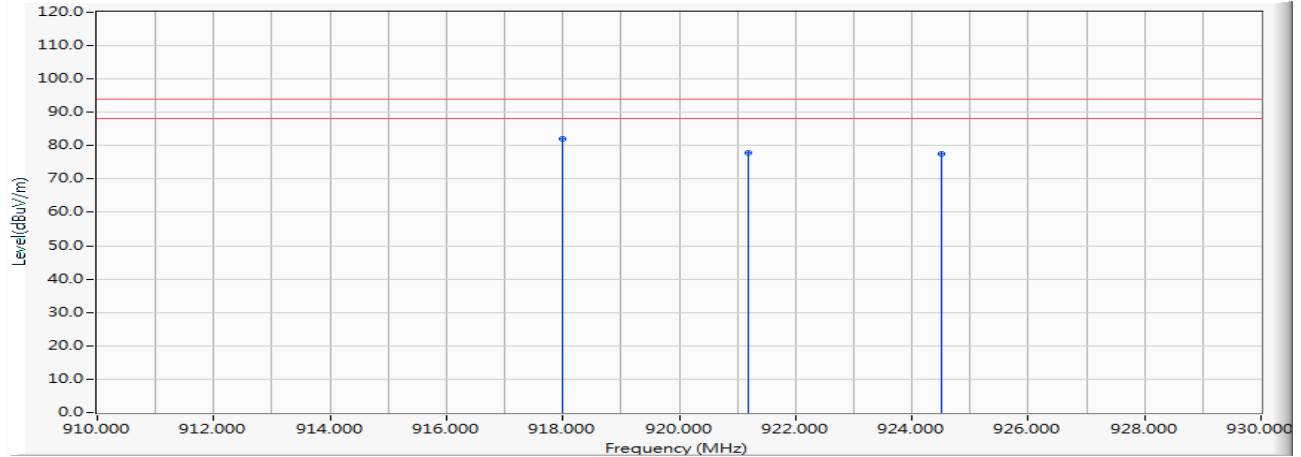
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	918.000	-10.193	92.680	82.487	-11.513	94.000	QUASIPeAK
2		921.200	-10.147	92.480	82.333	-11.667	94.000	QUASIPeAK
3		924.500	-9.905	91.900	81.995	-12.005	94.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Fundamental Radiated Emission
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit

HORIZONTAL_Z-Axis

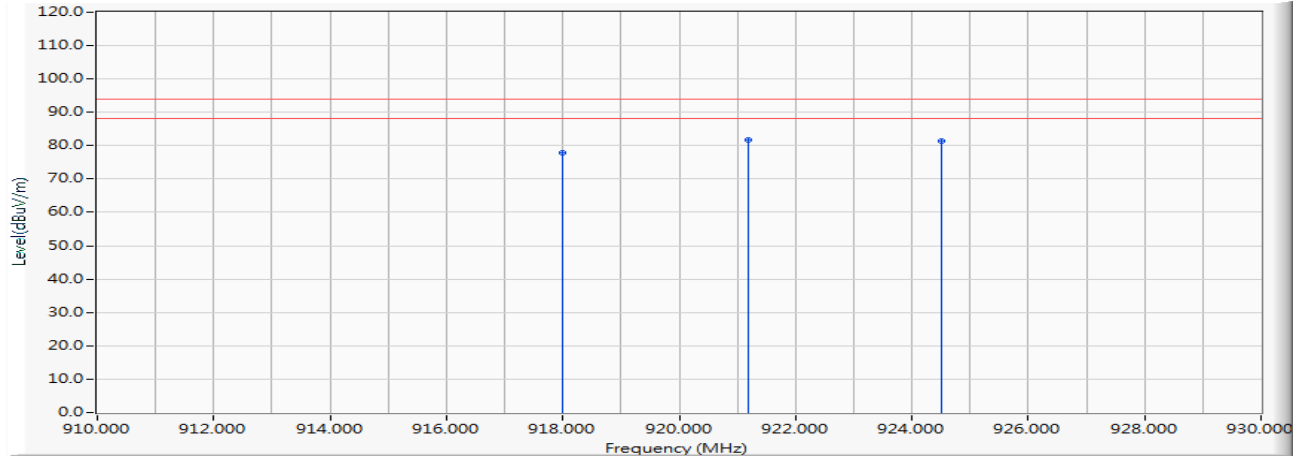


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	918.000	-10.193	92.340	82.147	-11.853	94.000	QUASIPeAK
2		921.200	-10.147	87.930	77.783	-16.217	94.000	QUASIPeAK
3		924.500	-9.905	87.440	77.535	-16.465	94.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Fundamental Radiated Emission
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit

VERTICAL_Z-Axis

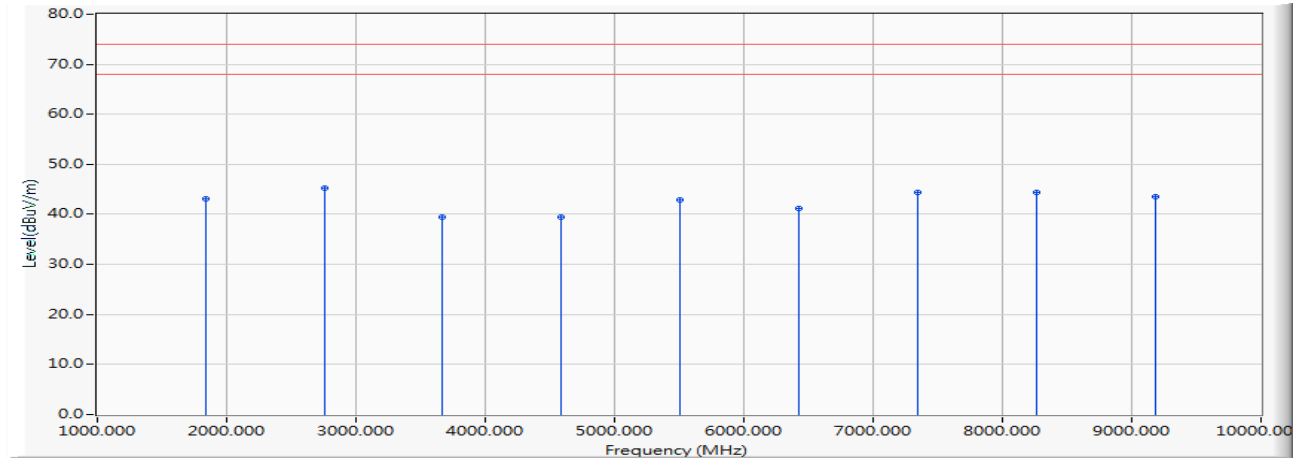
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		918.000	-10.193	87.930	77.737	-16.263	94.000	QUASIPeAK
2	*	921.200	-10.147	91.790	81.643	-12.357	94.000	QUASIPeAK
3		924.500	-9.905	91.310	81.405	-12.595	94.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (918MHz)

Horizontal



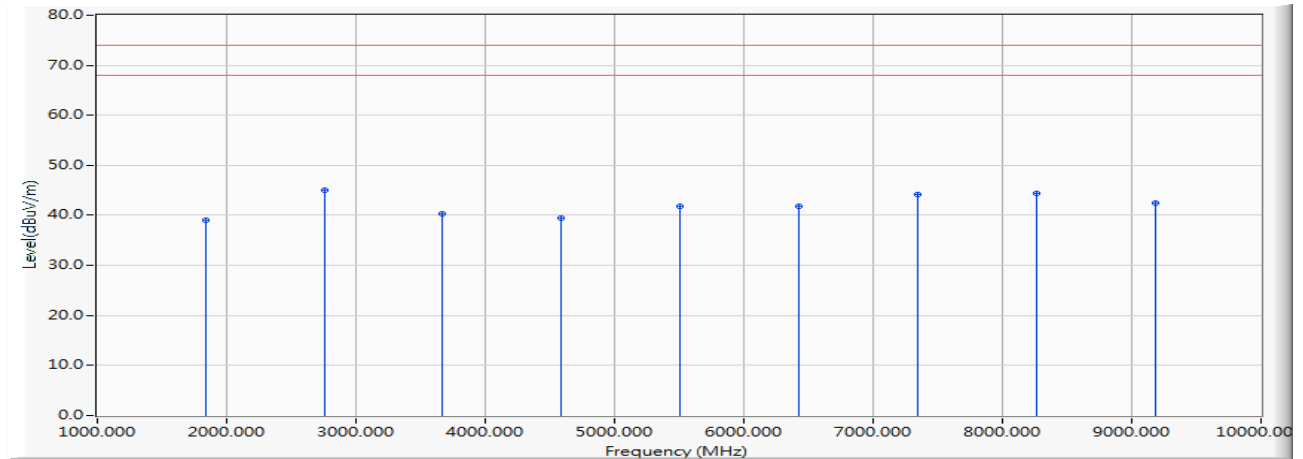
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1836.000	-23.541	66.700	43.159	-30.841	74.000	PEAK
2	*	2754.000	-19.613	64.950	45.338	-28.662	74.000	PEAK
3		3672.000	-16.500	55.950	39.450	-34.550	74.000	PEAK
4		4590.000	-16.642	56.020	39.378	-34.622	74.000	PEAK
5		5508.000	-13.887	56.850	42.962	-31.038	74.000	PEAK
6		6426.000	-14.548	55.720	41.172	-32.828	74.000	PEAK
7		7344.000	-13.374	57.850	44.476	-29.524	74.000	PEAK
8		8262.000	-13.860	58.320	44.461	-29.539	74.000	PEAK
9		9180.000	-12.172	55.640	43.468	-30.532	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (918MHz)

VERTICAL



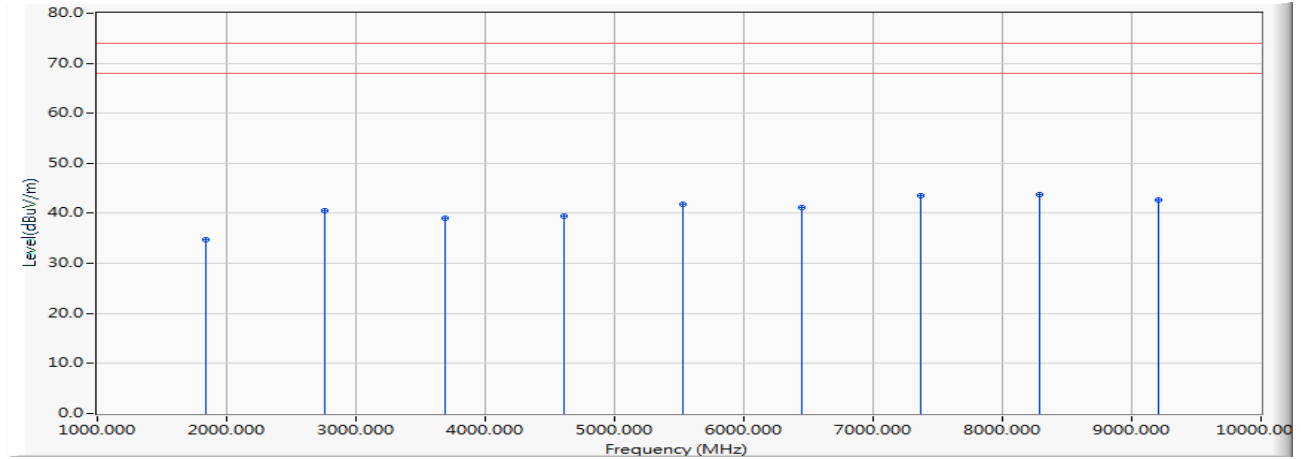
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1836.000	-23.541	62.530	38.989	-35.011	74.000	PEAK
2	*	2754.000	-19.613	64.680	45.068	-28.932	74.000	PEAK
3		3672.000	-16.500	56.730	40.230	-33.770	74.000	PEAK
4		4590.000	-16.642	56.060	39.418	-34.582	74.000	PEAK
5		5508.000	-13.887	55.710	41.822	-32.178	74.000	PEAK
6		6426.000	-14.548	56.390	41.842	-32.158	74.000	PEAK
7		7344.000	-13.374	57.660	44.286	-29.714	74.000	PEAK
8		8262.000	-13.860	58.220	44.361	-29.639	74.000	PEAK
9		9180.000	-12.172	54.700	42.528	-31.472	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (921.2MHz)

Horizontal



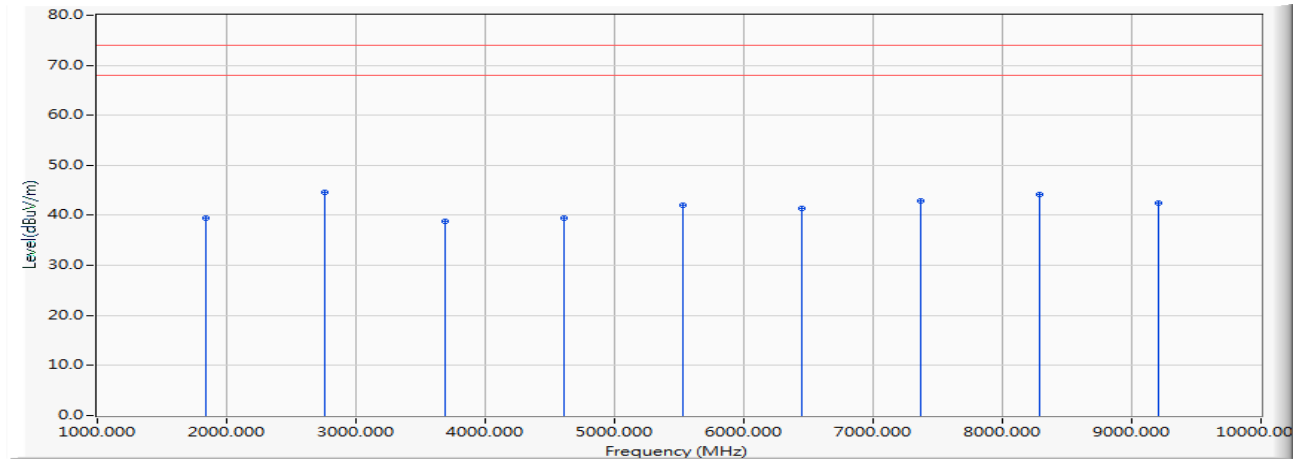
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1842.400	-23.462	58.270	34.808	-39.192	74.000	PEAK
2		2763.600	-19.549	60.040	40.491	-33.509	74.000	PEAK
3		3684.800	-16.442	55.510	39.068	-34.932	74.000	PEAK
4		4606.000	-16.632	56.040	39.408	-34.592	74.000	PEAK
5		5527.200	-13.974	55.820	41.846	-32.154	74.000	PEAK
6		6448.400	-14.660	55.770	41.110	-32.890	74.000	PEAK
7		7369.600	-13.684	57.280	43.596	-30.404	74.000	PEAK
8	*	8290.800	-14.160	57.940	43.780	-30.220	74.000	PEAK
9		9212.000	-12.036	54.620	42.584	-31.416	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (921.2MHz)

VERTICAL



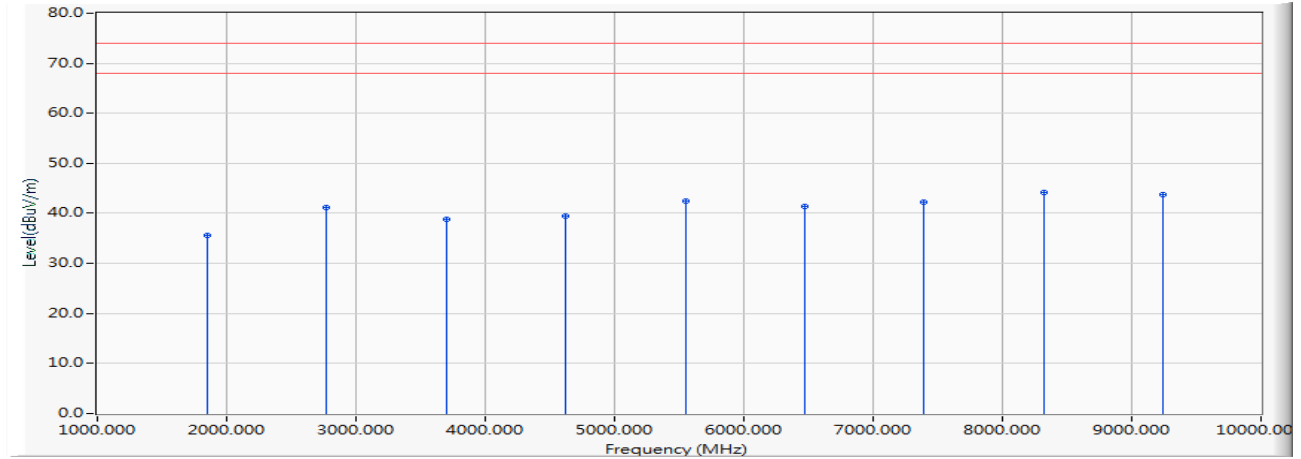
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1842.400	-23.462	62.960	39.498	-34.502	74.000	PEAK
2	*	2763.600	-19.549	64.220	44.671	-29.329	74.000	PEAK
3		3684.800	-16.442	55.170	38.728	-35.272	74.000	PEAK
4		4606.000	-16.632	56.200	39.568	-34.432	74.000	PEAK
5		5527.200	-13.974	55.960	41.986	-32.014	74.000	PEAK
6		6448.400	-14.660	55.980	41.320	-32.680	74.000	PEAK
7		7369.600	-13.684	56.650	42.966	-31.034	74.000	PEAK
8		8290.800	-14.160	58.240	44.080	-29.920	74.000	PEAK
9		9212.000	-12.036	54.590	42.554	-31.446	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (924.5MHz)

Horizontal

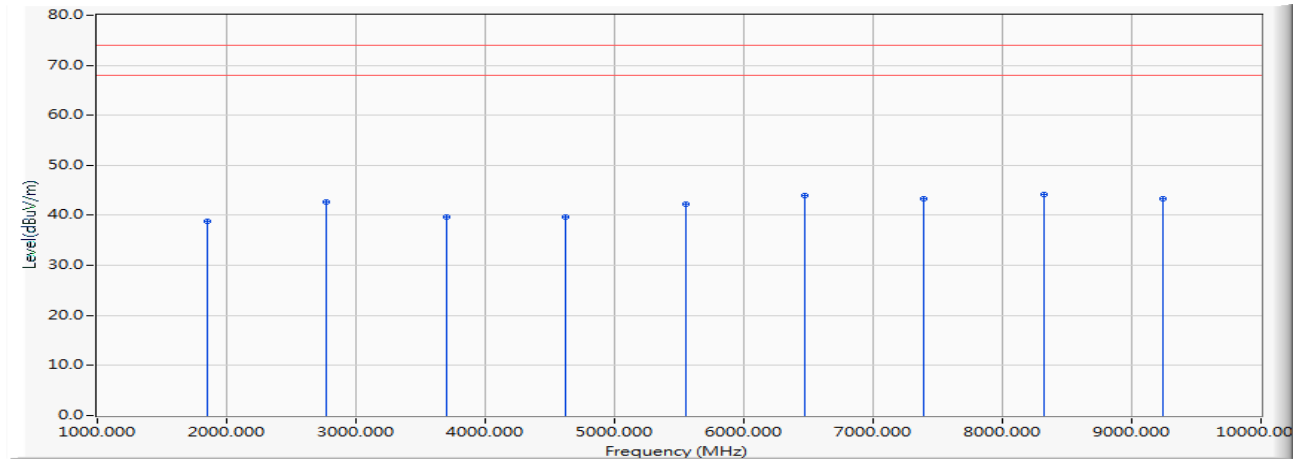


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1849.000	-23.380	59.050	35.670	-38.330	74.000	PEAK
2		2773.500	-19.484	60.660	41.177	-32.823	74.000	PEAK
3		3698.000	-16.377	55.300	38.924	-35.076	74.000	PEAK
4		4622.500	-16.600	56.070	39.470	-34.530	74.000	PEAK
5		5547.000	-14.062	56.550	42.488	-31.512	74.000	PEAK
6		6471.500	-14.775	56.110	41.335	-32.665	74.000	PEAK
7		7396.000	-13.994	56.340	42.346	-31.654	74.000	PEAK
8	*	8320.500	-14.407	58.630	44.223	-29.777	74.000	PEAK
9		9245.000	-11.915	55.570	43.655	-30.345	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (924.5MHz)

VERTICAL

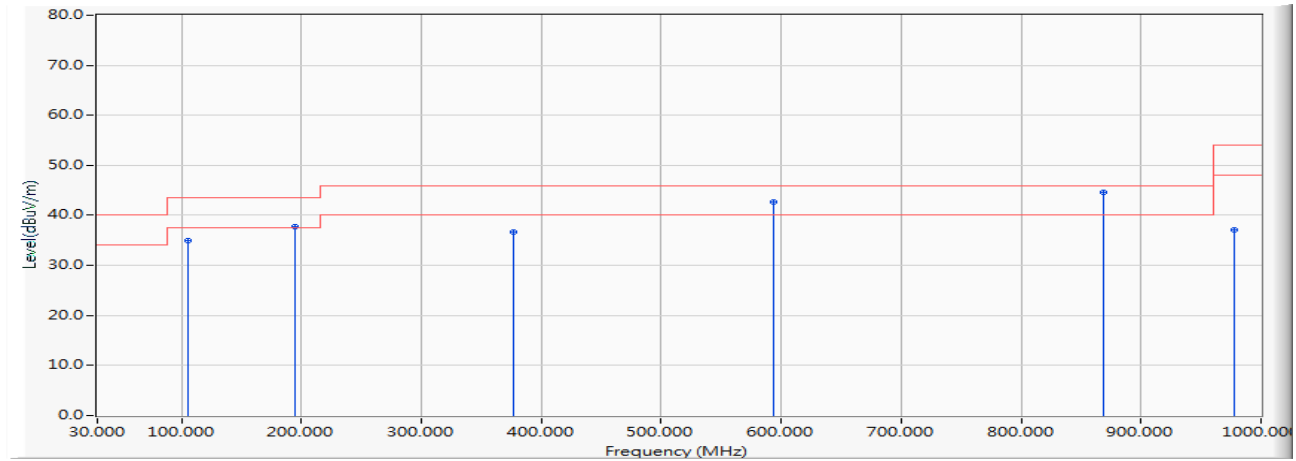
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		1849.000	-23.380	62.240	38.860	-35.140	74.000	PEAK
2		2773.500	-19.484	62.220	42.737	-31.263	74.000	PEAK
3		3698.000	-16.377	55.960	39.584	-34.416	74.000	PEAK
4		4622.500	-16.600	56.290	39.690	-34.310	74.000	PEAK
5		5547.000	-14.062	56.410	42.348	-31.652	74.000	PEAK
6		6471.500	-14.775	58.660	43.885	-30.115	74.000	PEAK
7		7396.000	-13.994	57.360	43.366	-30.634	74.000	PEAK
8	*	8320.500	-14.407	58.570	44.163	-29.837	74.000	PEAK
9		9245.000	-11.915	55.250	43.335	-30.665	74.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.

Product : Broadcast Transponder
 Test Item : General Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (918MHz)

HORIZONTAL

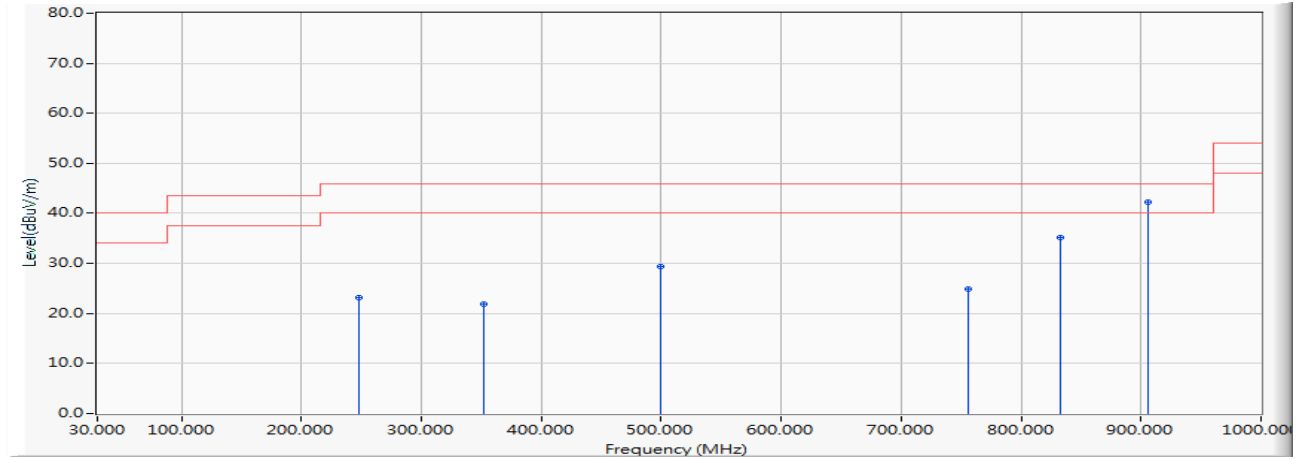


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		105.913	-16.484	51.340	34.855	-8.645	43.500	QUASIPeAK
2		194.478	-18.457	56.217	37.760	-5.740	43.500	QUASIPeAK
3		377.232	-12.158	48.896	36.738	-9.262	46.000	QUASIPeAK
4		593.725	-6.840	49.602	42.762	-3.238	46.000	QUASIPeAK
5	*	869.261	-8.344	52.916	44.572	-1.428	46.000	QUASIPeAK
6		977.507	-7.929	45.010	37.080	-16.920	54.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Broadcast Transponder
 Test Item : General Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (918MHz)

VERTICAL

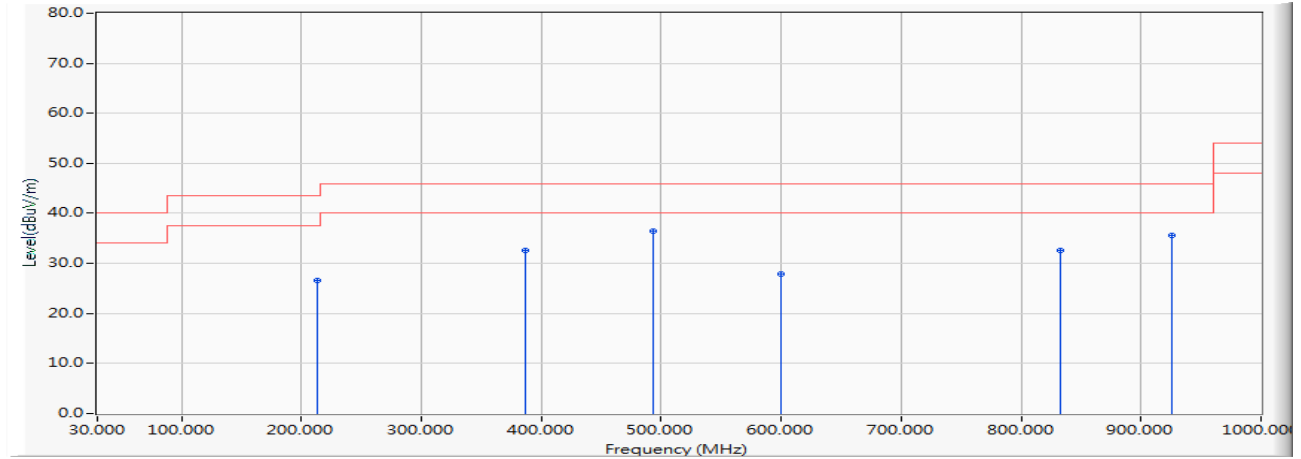
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		247.899	-18.058	41.273	23.214	-22.786	46.000	QUASIPeAK
2		351.928	-13.226	35.100	21.874	-24.126	46.000	QUASIPeAK
3		499.536	-10.897	40.377	29.481	-16.519	46.000	QUASIPeAK
4		755.391	-7.159	32.054	24.896	-21.104	46.000	QUASIPeAK
5		832.710	-8.557	43.739	35.182	-10.818	46.000	QUASIPeAK
6	*	905.812	-9.890	52.162	42.271	-3.729	46.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Broadcast Transponder
 Test Item : General Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (921.2MHz)

HORIZONTAL

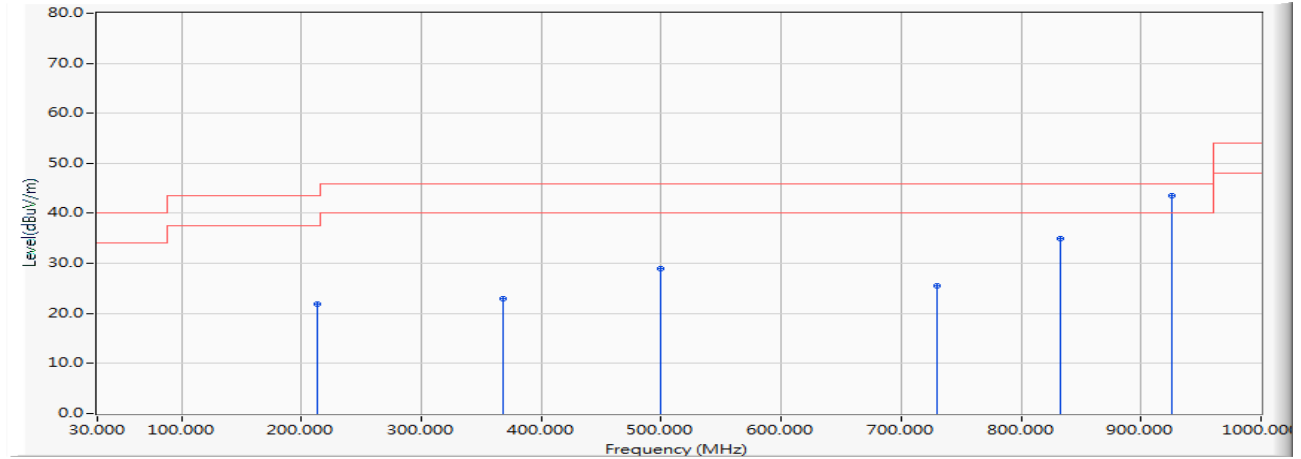


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		212.754	-18.160	44.757	26.597	-16.903	43.500	QUASIPeAK
2		387.072	-12.650	45.276	32.626	-13.374	46.000	QUASIPeAK
3	*	493.913	-11.278	47.633	36.356	-9.644	46.000	QUASIPeAK
4		599.348	-6.581	34.528	27.947	-18.053	46.000	QUASIPeAK
5		832.710	-8.557	41.194	32.637	-13.363	46.000	QUASIPeAK
6		925.493	-9.831	45.416	35.585	-10.415	46.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Broadcast Transponder
 Test Item : General Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (921.2MHz)

VERTICAL

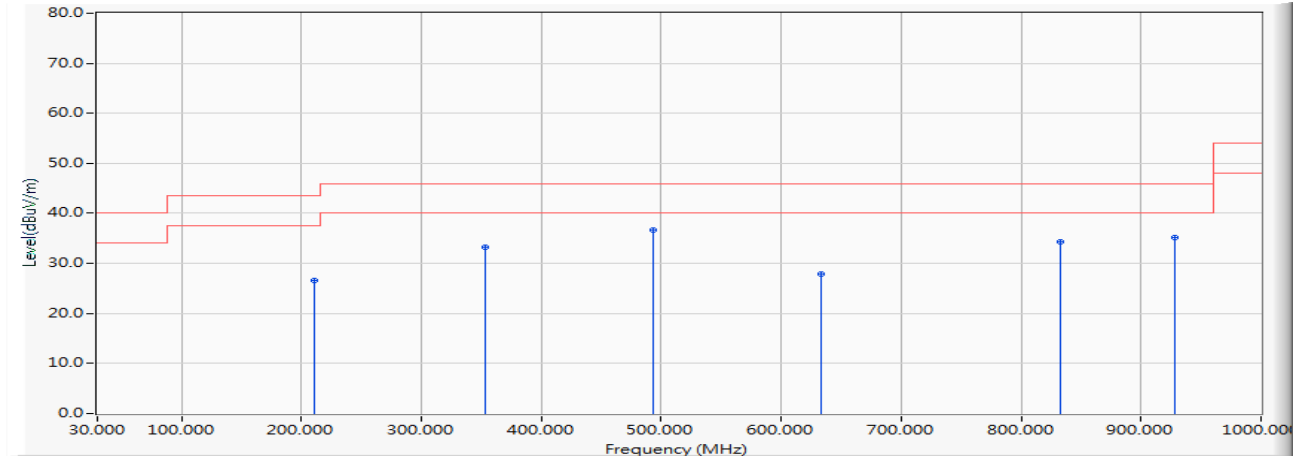
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		212.754	-18.160	40.003	21.843	-21.657	43.500	QUASIPeAK
2		368.797	-12.446	35.388	22.941	-23.059	46.000	QUASIPeAK
3		499.536	-10.897	39.811	28.915	-17.085	46.000	QUASIPeAK
4		730.087	-7.175	32.601	25.427	-20.573	46.000	QUASIPeAK
5		832.710	-8.557	43.548	34.991	-11.009	46.000	QUASIPeAK
6	*	925.493	-9.831	53.323	43.492	-2.508	46.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Broadcast Transponder
 Test Item : General Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (924.5MHz)

HORIZONTAL

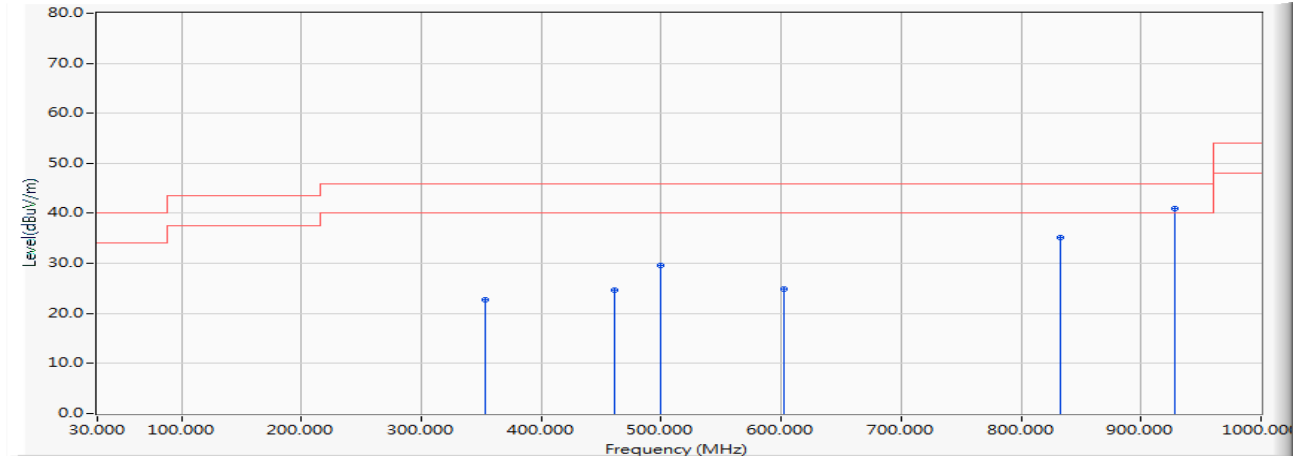


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		211.348	-18.181	44.802	26.620	-16.880	43.500	QUASIPeAK
2		353.333	-13.141	46.456	33.315	-12.685	46.000	QUASIPeAK
3	*	493.913	-11.278	48.008	36.731	-9.269	46.000	QUASIPeAK
4		633.087	-8.538	36.460	27.921	-18.079	46.000	QUASIPeAK
5		832.710	-8.557	42.779	34.222	-11.778	46.000	QUASIPeAK
6		928.304	-9.606	44.872	35.266	-10.734	46.000	QUASIPeAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Broadcast Transponder
 Test Item : General Radiated Emission Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (924.5MHz)

VERTICAL

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		353.333	-13.141	35.905	22.764	-23.236	46.000	QUASIPeAK
2		461.580	-10.668	35.301	24.633	-21.367	46.000	QUASIPeAK
3		499.536	-10.897	40.457	29.561	-16.439	46.000	QUASIPeAK
4		602.159	-6.708	31.498	24.789	-21.211	46.000	QUASIPeAK
5		832.710	-8.557	43.709	35.152	-10.848	46.000	QUASIPeAK
6	*	928.304	-9.606	50.611	41.005	-4.995	46.000	QUASIPeAK

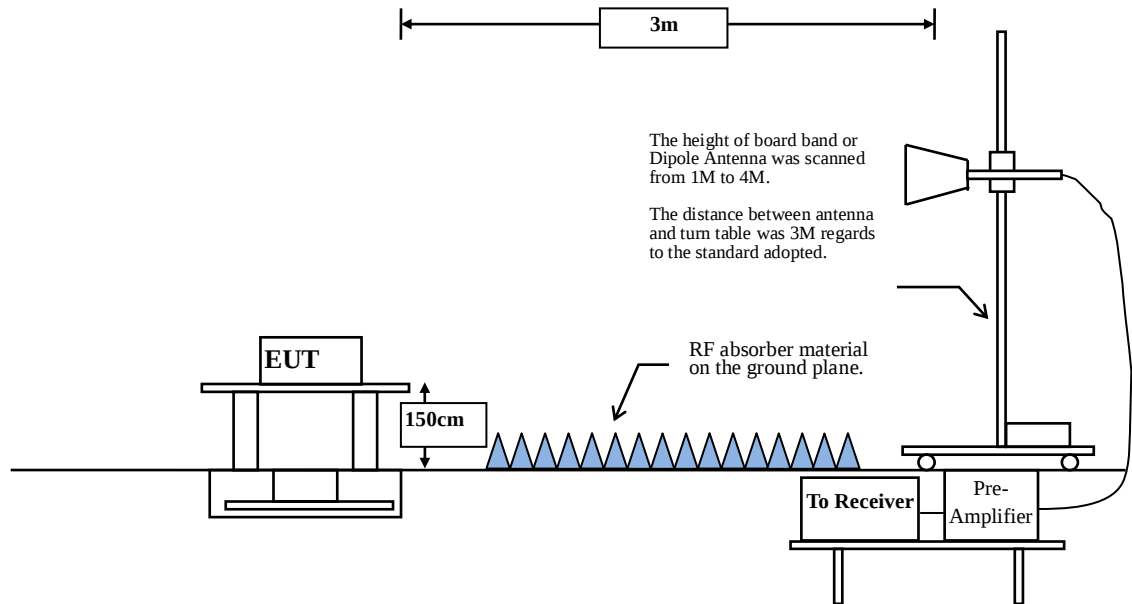
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

4. Band Edge

4.1. Test Setup

RF Radiated Measurement:



4.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.4. Uncertainty

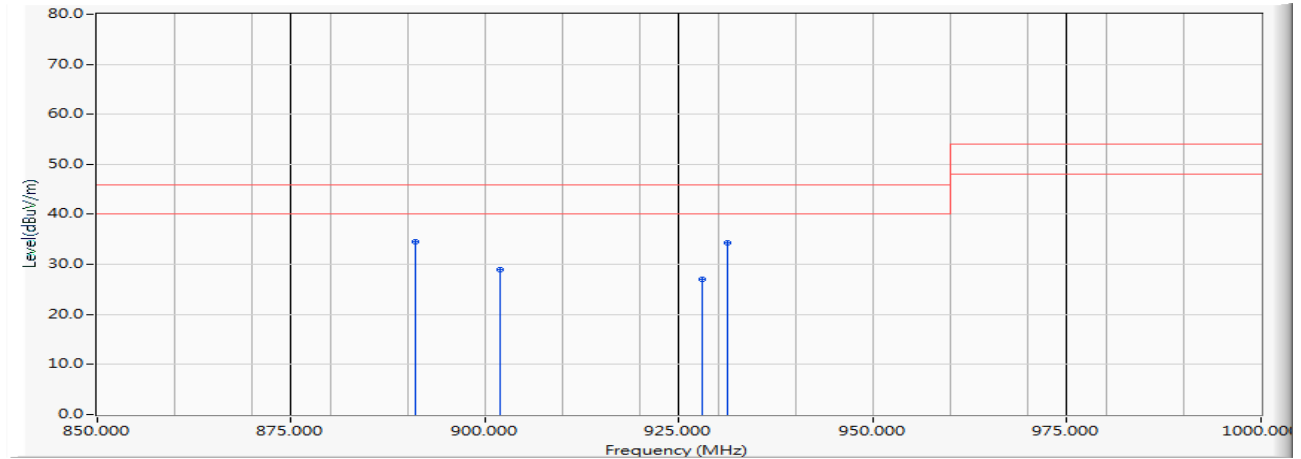
± 4.08 dB above 1GHz

± 4.22 dB below 1GHz

4.5. Test Result of Band Edge

Product : Broadcast Transponder
 Test Item : Band Edge Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (918MHz)

HORIZONTAL

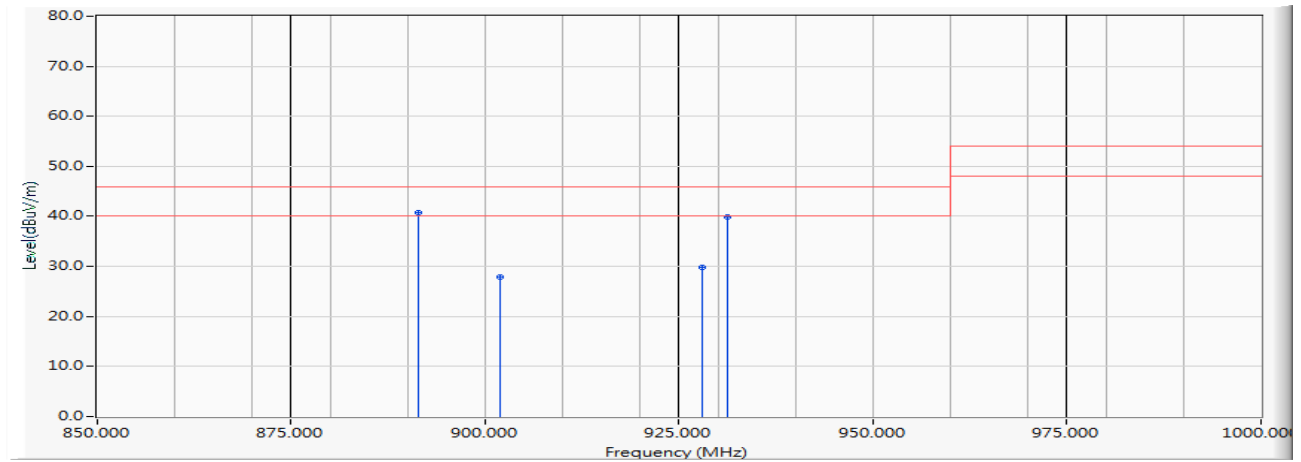


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	891.087	-9.104	43.726	34.622	-11.378	46.000	QUASIPeAK
2		902.000	-9.794	38.689	28.895	-17.105	46.000	QUASIPeAK
3		928.000	-9.631	36.698	27.067	-18.933	46.000	QUASIPeAK
4		931.304	-9.366	43.783	34.417	-11.583	46.000	QUASIPeAK

Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Broadcast Transponder
 Test Item : Band Edge Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (918MHz)

VERTICAL

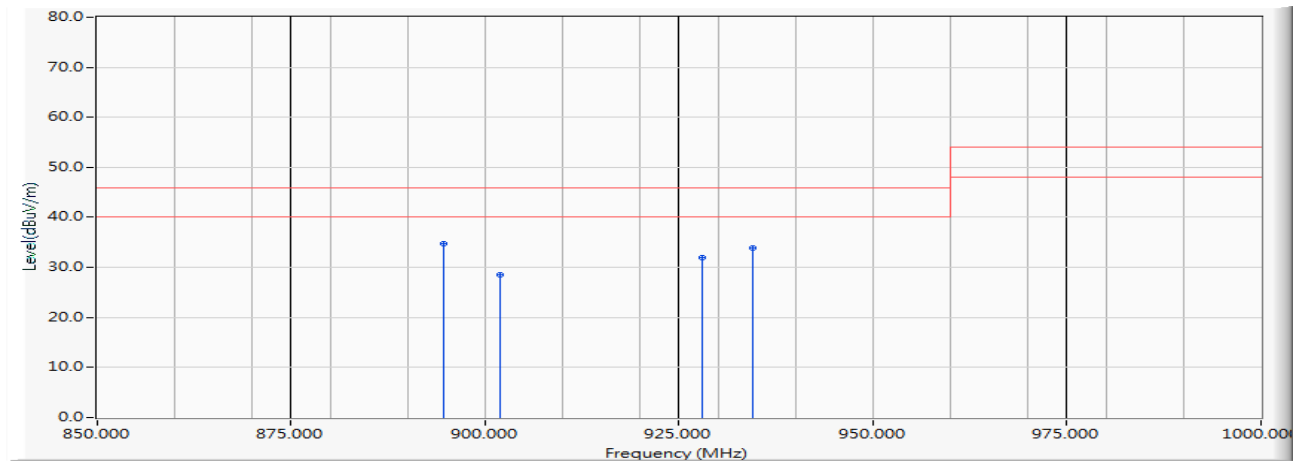
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	891.304	-9.121	49.963	40.842	-5.158	46.000	QUASIPeAK
2		902.000	-9.794	37.687	27.893	-18.107	46.000	QUASIPeAK
3		928.000	-9.631	39.479	29.848	-16.152	46.000	QUASIPeAK
4		931.304	-9.366	49.284	39.918	-6.082	46.000	QUASIPeAK

Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Broadcast Transponder
 Test Item : Band Edge Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (921.2MHz)

HORIZONTAL

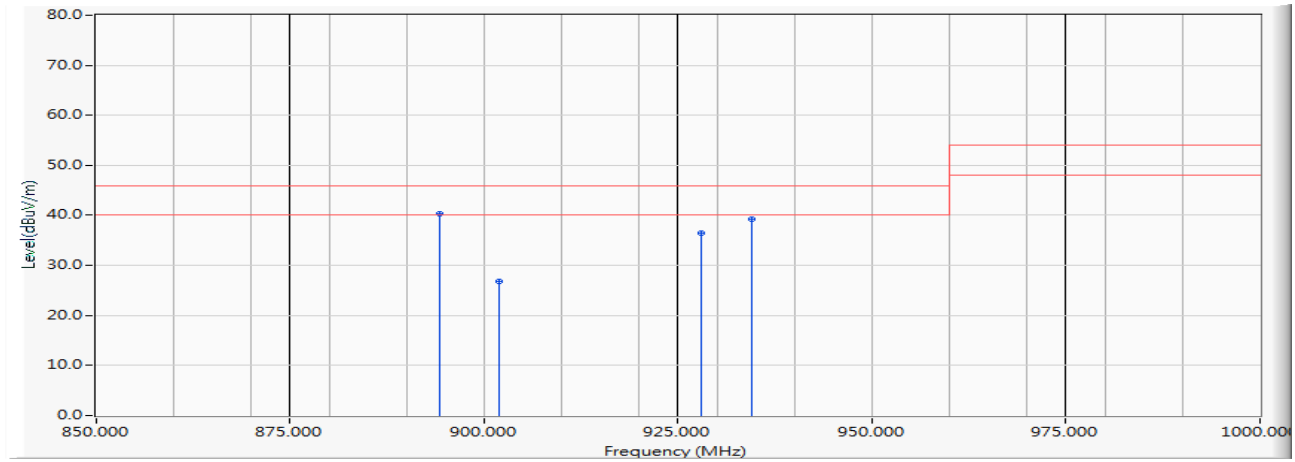


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	894.565	-9.395	44.153	34.758	-11.242	46.000	QUASIPeAK
2		902.000	-9.794	38.360	28.566	-17.434	46.000	QUASIPeAK
3		928.000	-9.631	41.552	31.921	-14.079	46.000	QUASIPeAK
4		934.565	-9.126	43.038	33.912	-12.088	46.000	QUASIPeAK

Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Broadcast Transponder
 Test Item : Band Edge Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (921.2MHz)

VERTICAL

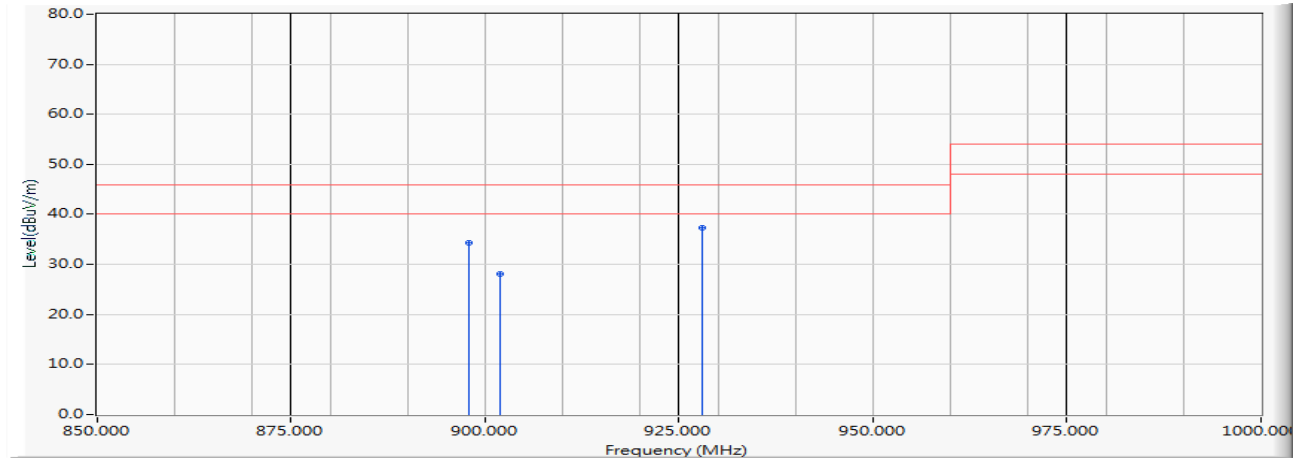
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	894.348	-9.377	49.706	40.329	-5.671	46.000	QUASIPeAK
2		902.000	-9.794	36.570	26.776	-19.224	46.000	QUASIPeAK
3		928.000	-9.631	46.097	36.466	-9.534	46.000	QUASIPeAK
4		934.565	-9.126	48.472	39.346	-6.654	46.000	QUASIPeAK

Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Broadcast Transponder
 Test Item : Band Edge Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (924.5MHz)

HORIZONTAL

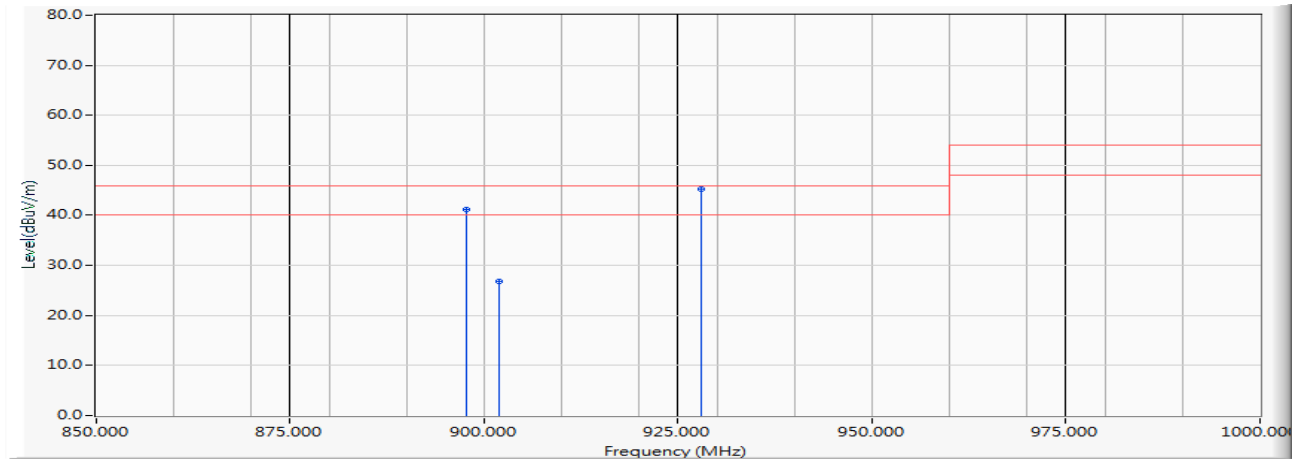


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		897.826	-9.623	43.919	34.297	-11.703	46.000	QUASIPeAK
2		902.000	-9.794	37.794	28.000	-18.000	46.000	QUASIPeAK
3	*	928.000	-9.631	46.963	37.332	-8.668	46.000	QUASIPeAK

Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

Product : Broadcast Transponder
 Test Item : Band Edge Data
 Test Date : 2019/08/14
 Test Mode : Mode 1: Transmit (924.5MHz)

VERTICAL

		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		897.609	-9.609	50.772	41.163	-4.837	46.000	QUASIPeAK
2		902.000	-9.794	36.705	26.911	-19.089	46.000	QUASIPeAK
3	*	928.000	-9.631	53.927	44.296	-1.704	46.000	QUASIPeAK

Note:

1. Quasi-Peak measurements: RBW=100kHz, VBW=1MHz, Sweep: Auto.
2. Measurement Level = Reading Level + Correct Factor.

5. **EMI Reduction Method During Compliance Testing**

No modification was made during testing.