

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT



PARTIAL REPORT

Applicant: DENSO International America, Inc.
2251 Rutherford Rd., Suite 100, Carlsbad, CA. 92008

Product Name: V2X On-Board Unit

Brand Name: DENSO

Model No.: Hercules H7.1E

Model Difference: N/A

Report Number: ER/2021/50151

FCC ID LXC-V2X-OBUE-HERC

Issue Date: July 23, 2021

Date of Test: July 12, 2021

Date of EUT Received: May 21, 2021

Approved By


Blue Yang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT comply with FCC rule part 2 & part §95 Subpart L.

The results of this report relate only to the sample identified in this report.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Revision History

Report Number	Revision	Description	Issue Date	Remark
ER/2021/50151	00	Original	July 23, 2021	Yuri Tsai

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	V2X On-Board Unit
Brand Name:	DENSO
Model No.:	Hercules H7.1E
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	U12QL1800006C01
Power Supply:	DC 12V

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1.2 Test Methodology of Applied Standards

FCC Part 95, Subpart L

FCC 47 CFR Part 2, 22H, 24E, 27C

KDB412172 D01 Determining ERP and EIRP v01r01

KDB 968740

ANSI C63.26:2015

Note: All test items have been performed and record as per the above standards.

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1.3 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction A	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		
Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.				

1.4 Special Accessories

AC Adapter is used while the test is conducted and there is no other accessory attached. This is the worst case condition.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT is configured to operate in a continuous transmission mode. EUT placement and various angles were checked to find worst mode where the emission characteristics are maximized.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Radiated Emissions (Simultaneous case)

The EUT was placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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2.4 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

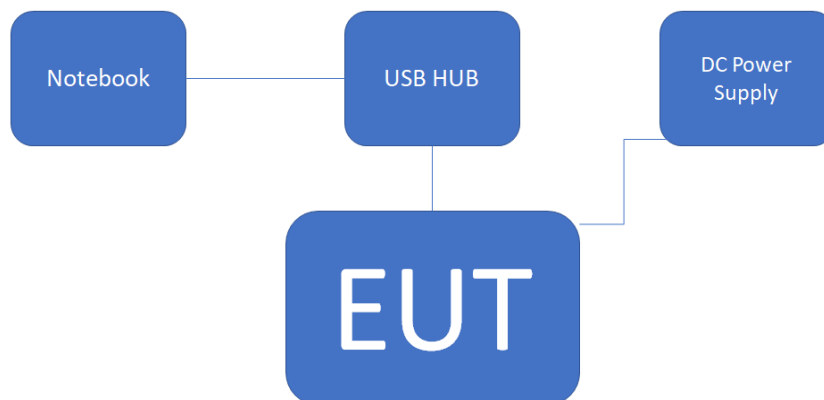


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	DC Power Supply	Agilent	E3640A	MY52410006	N/A	N/A
2.	Notebook	Lenovo	X240	PF-00UH6D	N/A	N/A
3.	4Ports USB HUB	Samrt	HB-560	20080701	N/A	N/A

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3 SUMMARY OF TEST RESULT

FCC Rules	Description Of Test	Result
§2.1053 §2.1057(a)(1) §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)(2)	Field Strength of Spurious Radiation	Compliant
§2.1053 §95.3189	Radiated Spurious Emission	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in DSRC Band

3 channels are provided for 10MHz

CHANNEL	FREQUENCY (MHz)
180	5900
182	5910
184	5920

4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.
4. For MIMO modes, the 2TX emission testing was considered as a worst case scenario and was performed at power levels, per transmit chain, greater than or equal to the maximum power in any 1TX mode.
5. The EUT is supporting LTE, 802.11 p mode, pre-scanned on simultaneous radiated emission on above available combinations, the worst case was reported on this report.
The field strength of radiation emission was measured H Plane as the worst case.

4.3 Simultaneous Radiated Emission Test Mode:

Mode 1: DSRC + GPR850

Mode 2: DSRC + GPR1900

Mode 3: DSRC + WCDMA B2

Mode 4: DSRC + WCDMA B4

Mode 5: DSRC + WCDMA B5

Mode 6: DSRC + LTE B2

Mode 7: DSRC + LTE B4

Mode 8: DSRC + LTE B5

Mode 9: DSRC + LTE B7

Mode 10: DSRC + LTE B12

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Power Output	+/- 1 dB
ERP/ EIRP measurement	+/- 3 dB
	+/- 3 dB
Emission Bandwidth	+/- 1.53 Hz
Out of Band Emissions at Antenna Terminals and Mask	+/- 1.69 dB
Frequency Stability vs. Temperature	+/- 1.53 Hz
Frequency Stability vs. Voltage	+/- 1.53 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	+/- 1 %

Test Items	Uncertainty
RF Power Output	+/- 1 dB
ERP/ EIRP measurement	+/- 3 dB
	+/- 3 dB
Emission Bandwidth	+/- 1.53 Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 1.69 dB
Peak to Average Ratio	+/- 1 dB
Frequency Stability vs. Temperature	+/- 1.53 Hz
Frequency Stability vs. Voltage	+/- 1.53 Hz
Temperature	+/- 0.4 °C
Humidity	+/- 3.5 %
DC / AC Power Source	+/- 1 %

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Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	+/-	2.64	dB	9kHz~30MHz
	+/-	4.93	dB	30MHz - 1000MHz
	+/-	4.81	dB	1GHz - 18GHz
	+/-	4.52	dB	18GHz - 40GHz
Polarization: Horizontal	+/-	2.64	dB	9kHz~30MHz
	+/-	4.45	dB	30MHz - 1000MHz
	+/-	4.81	dB	1GHz - 18GHz
	+/-	4.52	dB	18GHz - 40GHz

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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6 RADIATED EMISSION MEASUREMENT

6.1 Standard Applicable

For DSRC

According to Part 2.1053 and Part 95.3189 On-Board Unit transmitter types operating in the DSRC band must be designed to comply with the technical standard ASTM E2213-03 or IEEE 802.11p. The power in the transmitted spectrum for all DSRC devices shall be -25 dBm.

For PCB

According to FCC §2.1053,

FCC §22.917(a), §24.238(a), §27.53(h)

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §27.53(g) for LTE B12

Compliance for operations in the 600 MHz, 698-746 MHz, 746-758 MHz and the 776-788 MHz band with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC §27.53(h)(1) for LTE B4

(h) AWS emission limits—(1) *General protection levels*. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

FCC §27.53(m) (4) (6) for LTE B7

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less

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that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

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SGS Taiwan Ltd.

台灣檢驗科技股份有限公司

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6.2 Measurement Equipment Used

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Bi-log Antenna	SCHWARZBECK	VULB9168	378	08/06/2020	08/05/2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1441	10/16/2020	10/15/2021
Horn Antenna	SCHWARZBECK	BBHA9170	184	12/11/2020	12/10/2021
Horn Antenna	SCHWARZBECK	BBHA9170	185	07/30/2020	07/29/2021
Site Cal	SGS	SAC I chamber	N/A	01/01/2021	12/31/2021
Horn Antenna	SCHWARZBECK	BBHA9120D	D803	12/17/2020	12/16/2021
Bi-log Antenna	TESEO	CBL 6112D	35242 & AT-N0555	01/13/2021	01/12/2022
Spectrum Analyzer	Agilent	E4446A	MY51100003	10/29/2020	10/28/2021
Radio Communication Analyser	Anritsu	MT8815B	6200711454	04/07/2021	04/06/2022
Radio Communication Analyser	Anritsu	MT8820C	6201465317	02/24/2021	02/23/2022
DC Power Supply	Agilent	E3640A	MY52410006	12/17/2020	12/16/2021
Test Software	audix	e3	Ver. 6.11-20180413	01/01/2021	12/31/2021
Pre-Amplifier	EMC Instruments	EMC184045B	980135	12/16/2020	12/15/2021
Pre-Amplifier	HP	8449B	3008A01973	12/16/2020	12/15/2021
Pre-Amplifier	HP	8447D	2944A09469	12/16/2020	12/15/2021
Bandreject Filter 635-920	Micro-Tronics	WI	4	12/16/2020	12/15/2021
Bandreject Filter 800-1000	Micro-Tronics	EWT	M1	12/16/2020	12/15/2021
Bandreject Filter 1700-2000	Micro-Tronics	EWT	M3	12/16/2020	12/15/2021
Bandreject Filter 2240-2700	Micro-Tronics	WI	2	12/16/2020	12/15/2021
1.3G-15GHz High Pass Filter	WI	WHKX10-1066-80SS	19	04/20/2021	12/15/2021
3.2GHz High Pass Filter	WI	WHKX10-2624-80SS	3	04/20/2021	12/15/2021
7GHz High Pass Filter	WI	WHKX10-6090-80SS	3	04/20/2021	12/15/2021
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	EMC 104-SM-SM-2000	160123	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2630/2	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY22962/2	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	SUCOFLEX 102	SN 520430/2	12/16/2020	12/15/2021

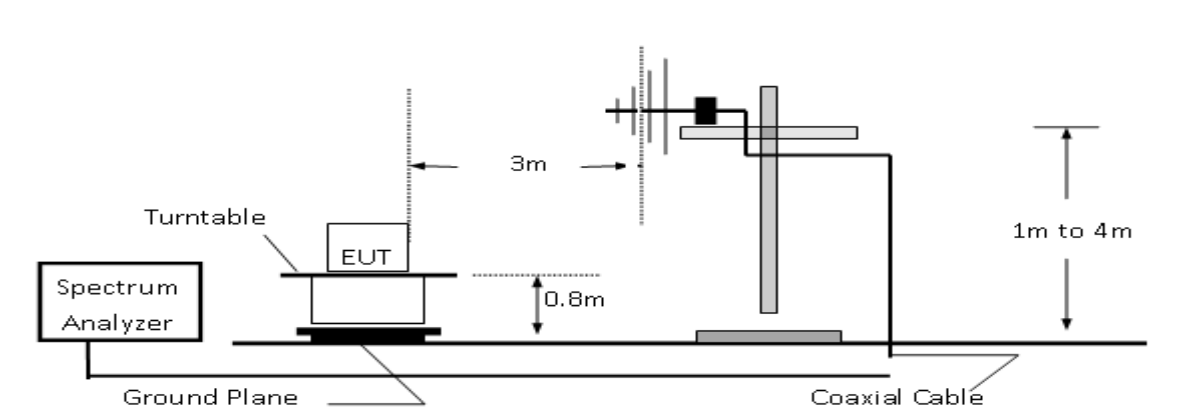
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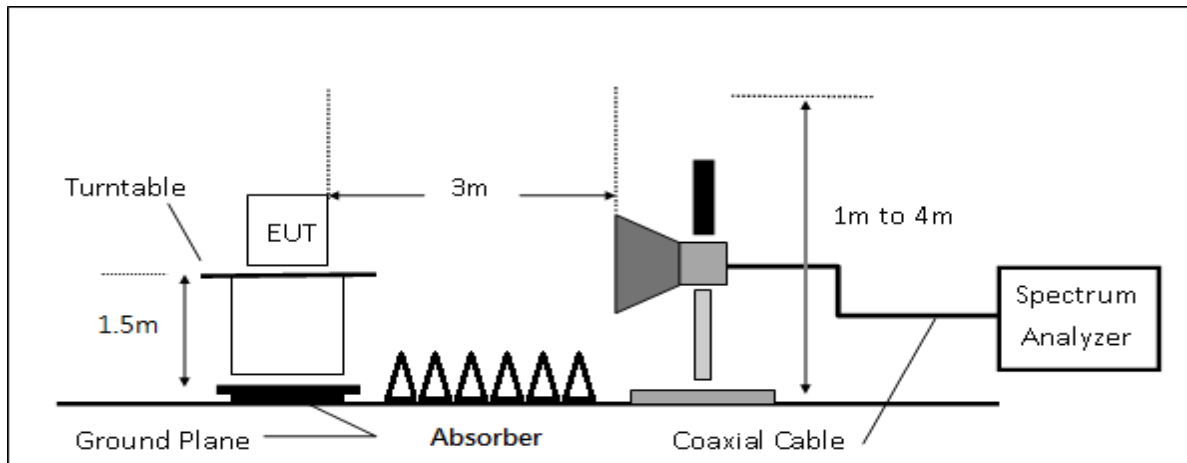
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6.3 Test SET-UP

(A) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz

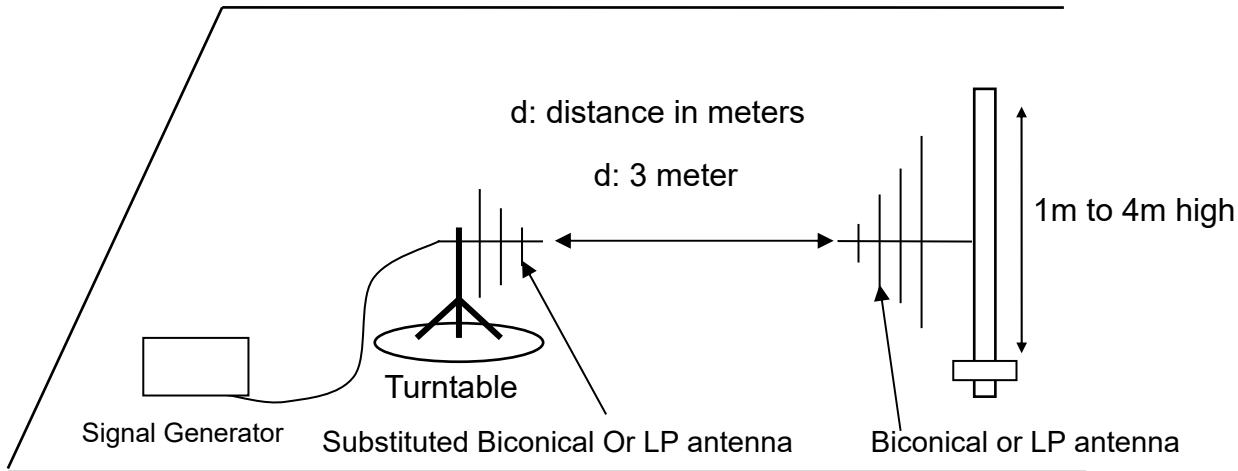


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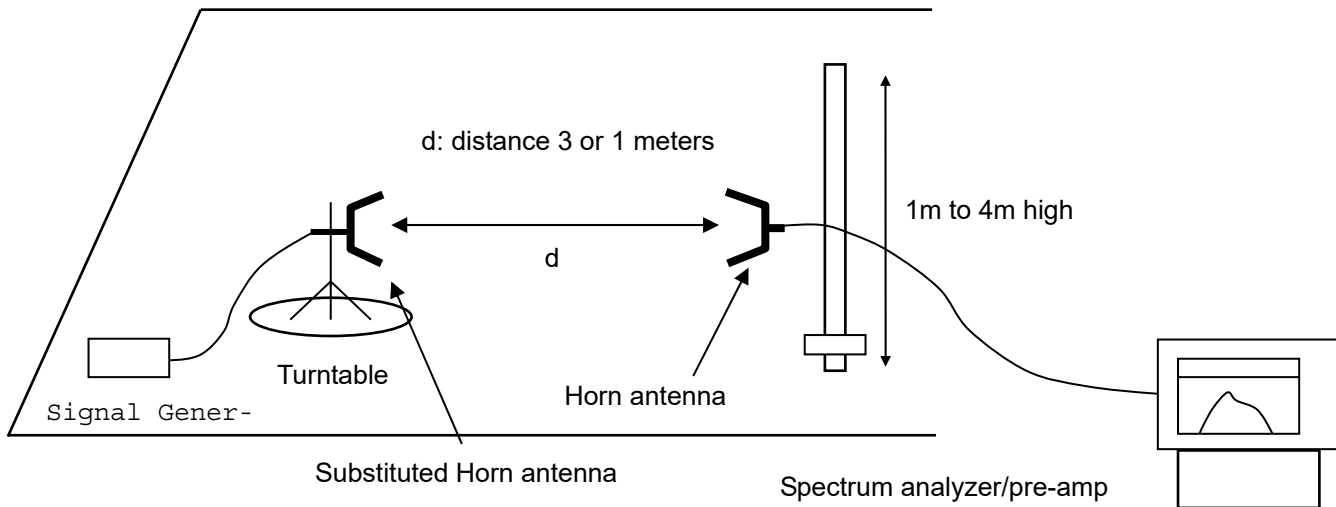
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(C).Substitution Measurement Frequency Below 1GHz



(D).Substitution Measurement Frequency Above 1GHz



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6.4 Measurement Procedure (Simultaneous case)

1. The testing follows the Measurement Procedure of ANSI C63.10:2013.
2. The EUT was placed on a turn table with 0.8m for frequency < 1GHz and 1.5m for frequency > 1GHz above ground plan.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
8. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
11. Repeat above procedures until all default test channel measured were complete.

6.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where *FS* = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

*The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)*

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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6.6 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

6.7 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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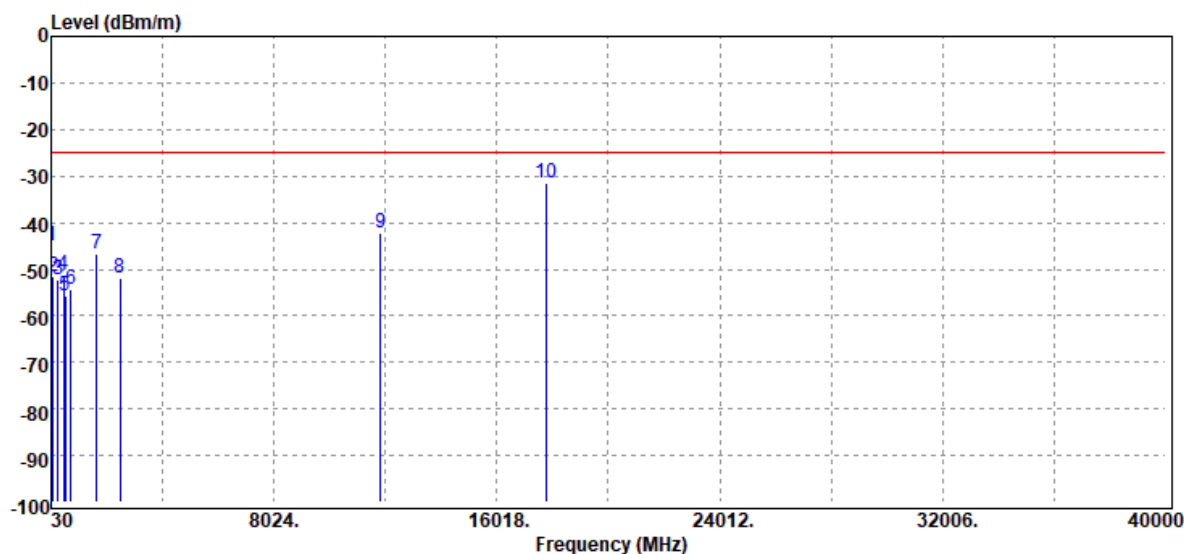
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Radiated Spurious Emission Measurement Result

DSRC + GPR850

Report Number :ER/2021/50151
 Operation Mode :DSRC_GPR850
 Test Mode :Tx CH High_Mid
 EUT Pol :H Plane
 Test Frequency :5920 MHz_836.6 MHz

Test Site :SAC I Chamber
 Test Date :2021-07-12
 Temp./Humi. :27.5/65
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.06	-30.69	-13.72	-0.65	-25.00	-20.06
95.96	-51.44	-50.16	-0.28	-1.00	-25.00	-26.44
288.99	-52.18	-54.49	4.04	-1.73	-25.00	-27.18
479.11	-51.22	-53.00	4.21	-2.43	-25.00	-26.22
527.61	-55.80	-57.94	4.17	-2.03	-25.00	-30.80
735.19	-54.42	-54.85	3.00	-2.57	-25.00	-29.42
1673.20	-46.58	-51.84	9.55	-4.29	-25.00	-21.58
2509.80	-51.99	-57.41	10.62	-5.20	-25.00	-26.99
11840.00	-42.34	-42.64	12.62	-12.32	-25.00	-17.34
17760.00	-31.50	-27.20	9.80	-14.10	-25.00	-6.50

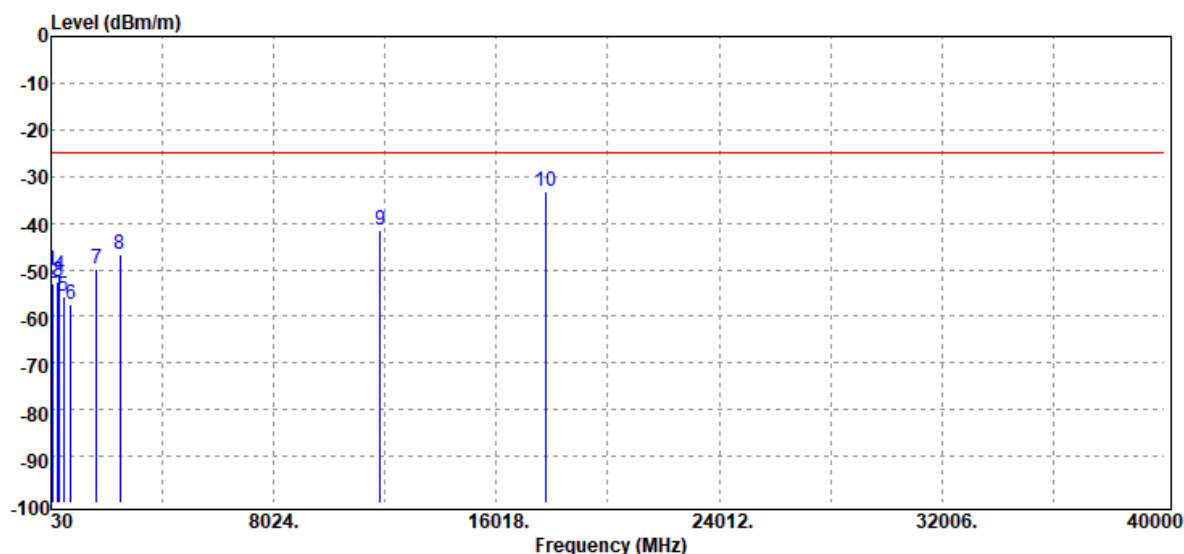
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Report Number :ER/2021/50151
Operation Mode :DSRC_GPR850
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_836.6 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-50.25	-35.88	-13.72	-0.65	-25.00	-25.25
95.96	-53.00	-51.72	-0.28	-1.00	-25.00	-28.00
288.99	-52.59	-54.90	4.04	-1.73	-25.00	-27.59
335.55	-51.08	-53.46	4.28	-1.90	-25.00	-26.08
479.11	-55.78	-57.56	4.21	-2.43	-25.00	-30.78
740.04	-57.39	-57.84	2.86	-2.41	-25.00	-32.39
1673.20	-49.96	-55.22	9.55	-4.29	-25.00	-24.96
2509.80	-46.55	-51.97	10.62	-5.20	-25.00	-21.55
11840.00	-41.58	-41.88	12.62	-12.32	-25.00	-16.58
17760.00	-33.32	-29.02	9.80	-14.10	-25.00	-8.32

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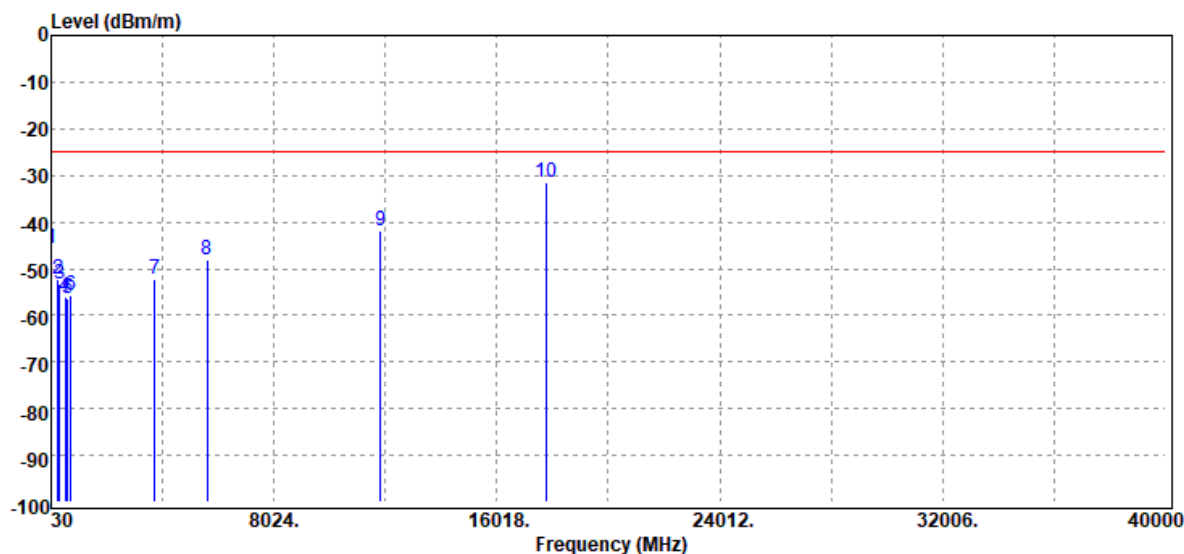
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DSRC + GPR1900

Report Number :ER/2021/50151
Operation Mode :DSRC_GPR1900
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1880 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :VERTICAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.70	-31.33	-13.72	-0.65	-25.00	-20.70
288.99	-52.27	-54.58	4.04	-1.73	-25.00	-27.27
335.55	-53.32	-55.70	4.28	-1.90	-25.00	-28.32
527.61	-56.04	-58.18	4.17	-2.03	-25.00	-31.04
624.61	-56.46	-57.61	3.49	-2.34	-25.00	-31.46
730.34	-55.56	-55.97	3.14	-2.73	-25.00	-30.56
3760.00	-52.35	-57.12	12.40	-7.63	-25.00	-27.35
5640.00	-48.12	-51.89	13.00	-9.23	-25.00	-23.12
11840.00	-41.83	-42.13	12.62	-12.32	-25.00	-16.83
17760.00	-31.44	-27.14	9.80	-14.10	-25.00	-6.44

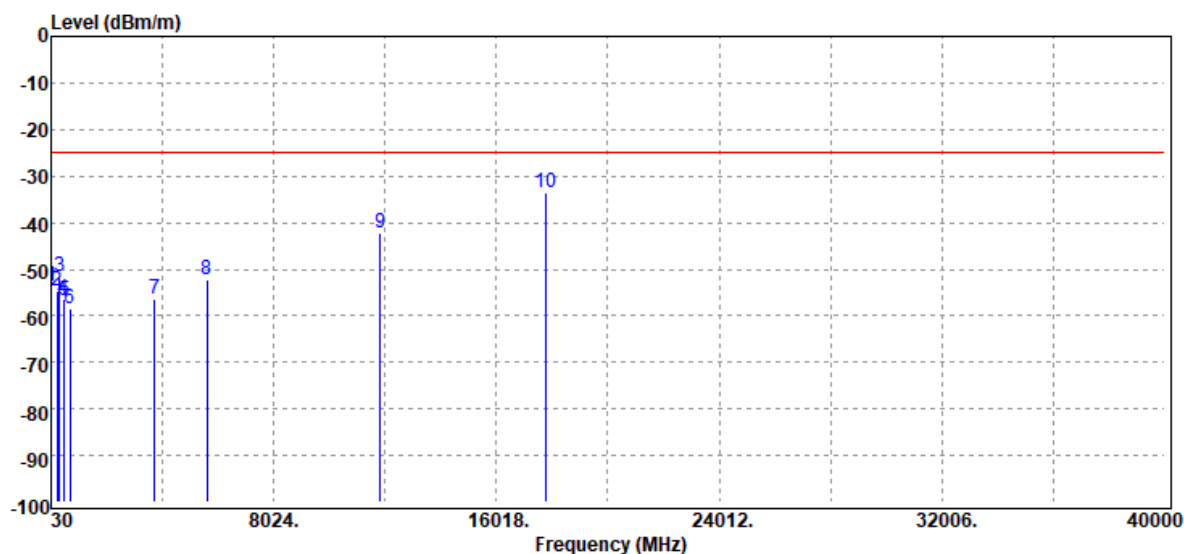
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Report Number :ER/2021/50151
Operation Mode :DSRC_GPR1900
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1880 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-53.77	-39.40	-13.72	-0.65	-25.00	-28.77
240.49	-54.52	-57.29	4.38	-1.61	-25.00	-29.52
335.55	-51.53	-53.91	4.28	-1.90	-25.00	-26.53
479.11	-56.43	-58.21	4.21	-2.43	-25.00	-31.43
500.45	-56.76	-58.60	4.25	-2.41	-25.00	-31.76
720.64	-58.57	-59.43	3.48	-2.62	-25.00	-33.57
3760.00	-56.50	-61.27	12.40	-7.63	-25.00	-31.50
5640.00	-52.10	-55.87	13.00	-9.23	-25.00	-27.10
11840.00	-42.15	-42.45	12.62	-12.32	-25.00	-17.15
17760.00	-33.62	-29.32	9.80	-14.10	-25.00	-8.62

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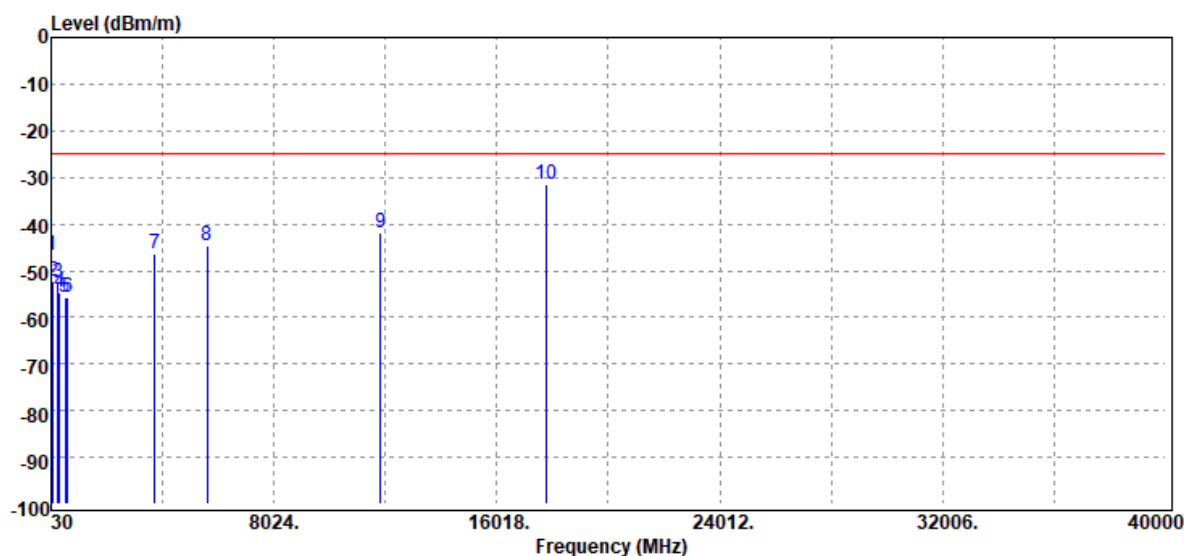
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DSRC + WCDMA B2

Report Number :ER/2021/50151
 Operation Mode :DSRC_WCDMA B2
 Test Mode :Tx CH High_Mid
 EUT Pol :H Plane
 Test Frequency :5920 MHz_1880 MHz

Test Site :SAC I Chamber
 Test Date :2021-07-12
 Temp./Humi. :27.5/65
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-46.62	-32.25	-13.72	-0.65	-25.00	-21.62
95.96	-52.26	-50.98	-0.28	-1.00	-25.00	-27.26
288.99	-52.67	-54.98	4.04	-1.73	-25.00	-27.67
335.55	-54.77	-57.15	4.28	-1.90	-25.00	-29.77
527.61	-55.74	-57.88	4.17	-2.03	-25.00	-30.74
623.64	-55.74	-56.89	3.48	-2.33	-25.00	-30.74
3760.00	-46.44	-51.21	12.40	-7.63	-25.00	-21.44
5640.00	-44.77	-48.54	13.00	-9.23	-25.00	-19.77
11840.00	-41.90	-42.20	12.62	-12.32	-25.00	-16.90
17760.00	-31.49	-27.19	9.80	-14.10	-25.00	-6.49

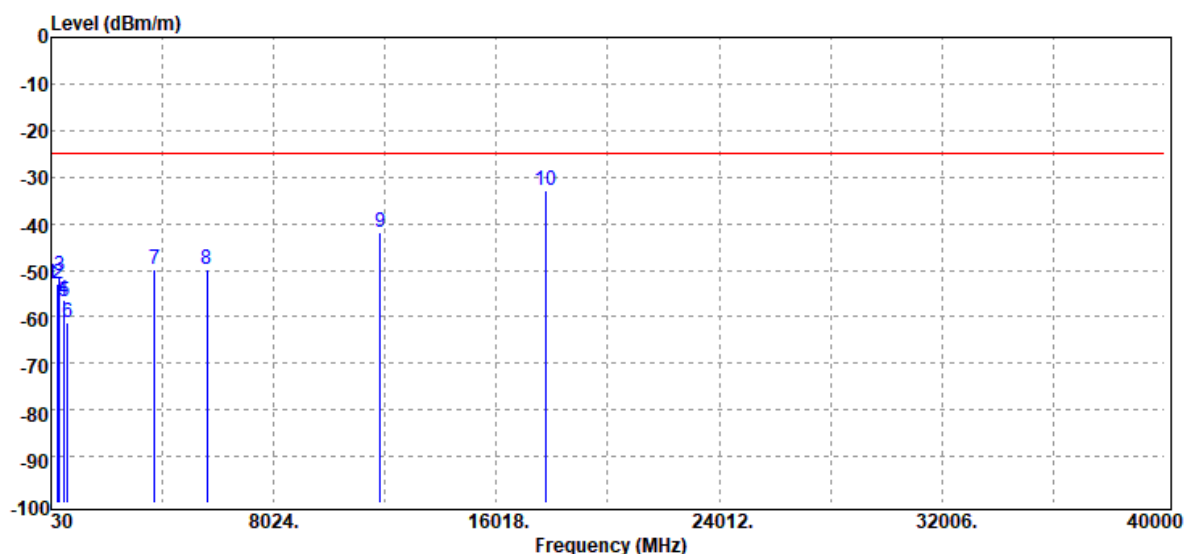
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Report Number :ER/2021/50151
Operation Mode :DSRC_WCDMA B2
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1880 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-52.79	-38.42	-13.72	-0.65	-25.00	-27.79
288.99	-53.08	-55.39	4.04	-1.73	-25.00	-28.08
335.55	-51.25	-53.63	4.28	-1.90	-25.00	-26.25
479.11	-56.46	-58.24	4.21	-2.43	-25.00	-31.46
500.45	-56.81	-58.65	4.25	-2.41	-25.00	-31.81
624.61	-61.36	-62.51	3.49	-2.34	-25.00	-36.36
3760.00	-49.66	-54.43	12.40	-7.63	-25.00	-24.66
5640.00	-49.83	-53.60	13.00	-9.23	-25.00	-24.83
11840.00	-41.75	-42.05	12.62	-12.32	-25.00	-16.75
17760.00	-32.89	-28.59	9.80	-14.10	-25.00	-7.89

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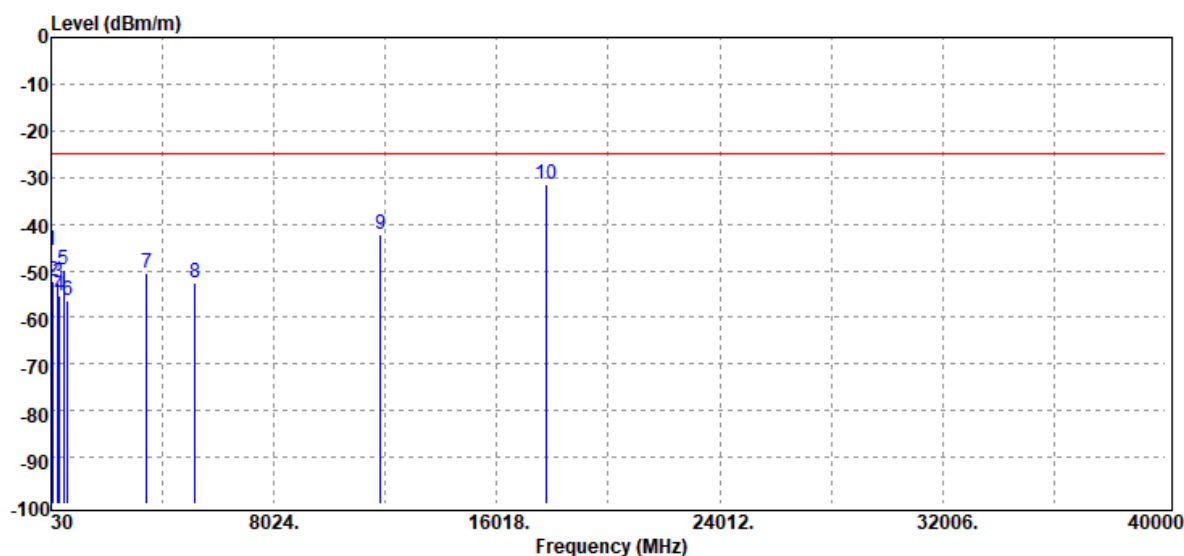
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DSRC + WCDMA B4

Report Number :ER/2021/50151
Operation Mode :DSRC_WCDMA B4
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1732.4 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :VERTICAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.54	-31.17	-13.72	-0.65	-25.00	-20.54
95.96	-52.16	-50.88	-0.28	-1.00	-25.00	-27.16
288.99	-52.52	-54.83	4.04	-1.73	-25.00	-27.52
335.55	-55.37	-57.75	4.28	-1.90	-25.00	-30.37
479.11	-49.88	-51.66	4.21	-2.43	-25.00	-24.88
623.64	-56.37	-57.52	3.48	-2.33	-25.00	-31.37
3464.80	-50.51	-56.88	12.47	-6.10	-25.00	-25.51
5197.20	-52.74	-57.24	12.38	-7.88	-25.00	-27.74
11840.00	-42.19	-42.49	12.62	-12.32	-25.00	-17.19
17760.00	-31.34	-27.04	9.80	-14.10	-25.00	-6.34

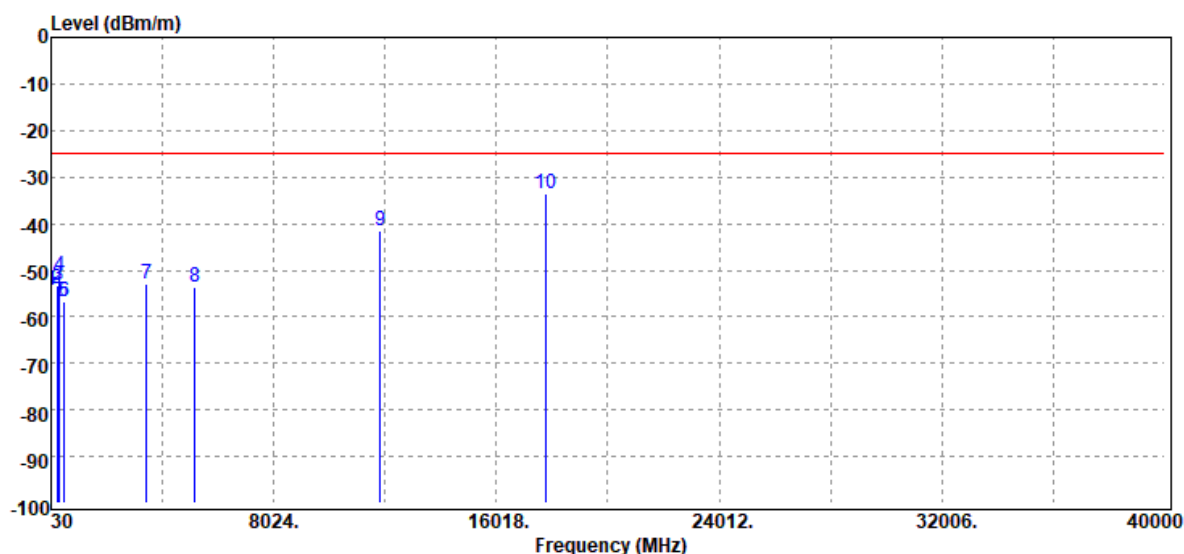
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Report Number :ER/2021/50151
Operation Mode :DSRC_WCDMA B4
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1732.4 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-54.23	-39.86	-13.72	-0.65	-25.00	-29.23
240.49	-53.87	-56.64	4.38	-1.61	-25.00	-28.87
288.99	-53.12	-55.43	4.04	-1.73	-25.00	-28.12
335.55	-51.22	-53.60	4.28	-1.90	-25.00	-26.22
479.11	-56.70	-58.48	4.21	-2.43	-25.00	-31.70
500.45	-56.88	-58.72	4.25	-2.41	-25.00	-31.88
3464.80	-52.93	-59.30	12.47	-6.10	-25.00	-27.93
5197.20	-53.47	-57.97	12.38	-7.88	-25.00	-28.47
11840.00	-41.40	-41.70	12.62	-12.32	-25.00	-16.40
17760.00	-33.47	-29.17	9.80	-14.10	-25.00	-8.47

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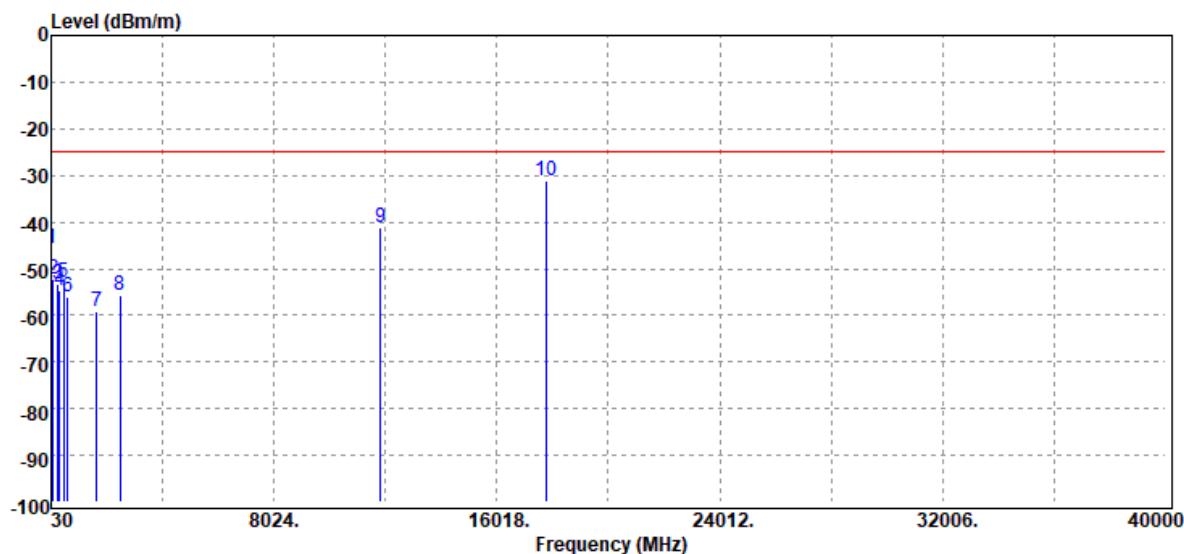
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DSRC + WCDMA B5

Report Number :ER/2021/50151
 Operation Mode :DSRC_WCDMA B5
 Test Mode :Tx CH High_Mid
 EUT Pol :H Plane
 Test Frequency :5920 MHz_836.6 MHz

Test Site :SAC I Chamber
 Test Date :2021-07-12
 Temp./Humi. :27.5/65
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.52	-31.15	-13.72	-0.65	-25.00	-20.52
95.96	-52.40	-51.12	-0.28	-1.00	-25.00	-27.40
288.99	-53.16	-55.47	4.04	-1.73	-25.00	-28.16
335.55	-54.63	-57.01	4.28	-1.90	-25.00	-29.63
479.11	-53.00	-54.78	4.21	-2.43	-25.00	-28.00
623.64	-55.90	-57.05	3.48	-2.33	-25.00	-30.90
1673.20	-59.29	-64.55	9.55	-4.29	-25.00	-34.29
2509.80	-55.85	-61.27	10.62	-5.20	-25.00	-30.85
11840.00	-41.33	-41.63	12.62	-12.32	-25.00	-16.33
17760.00	-31.17	-26.87	9.80	-14.10	-25.00	-6.17

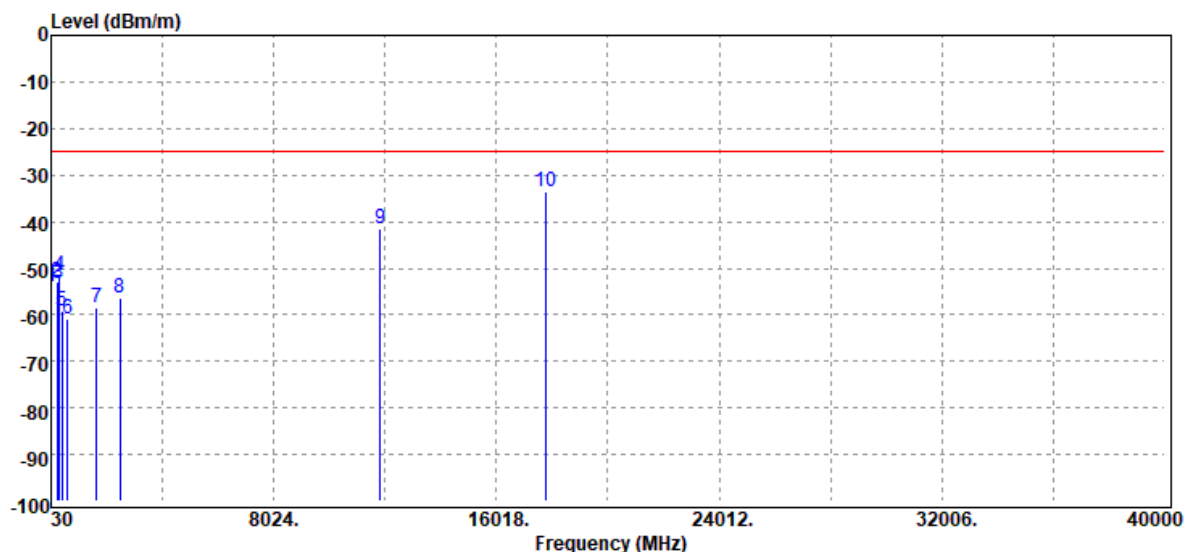
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Report Number :ER/2021/50151
Operation Mode :DSRC_WCDMA B5
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_836.6 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-54.09	-39.72	-13.72	-0.65	-25.00	-29.09
240.49	-53.01	-55.78	4.38	-1.61	-25.00	-28.01
288.99	-53.19	-55.50	4.04	-1.73	-25.00	-28.19
335.55	-51.40	-53.78	4.28	-1.90	-25.00	-26.40
432.55	-59.07	-60.96	3.95	-2.06	-25.00	-34.07
623.64	-60.83	-61.98	3.48	-2.33	-25.00	-35.83
1673.20	-58.60	-63.86	9.55	-4.29	-25.00	-33.60
2509.80	-56.33	-61.75	10.62	-5.20	-25.00	-31.33
11840.00	-41.64	-41.94	12.62	-12.32	-25.00	-16.64
17760.00	-33.44	-29.14	9.80	-14.10	-25.00	-8.44

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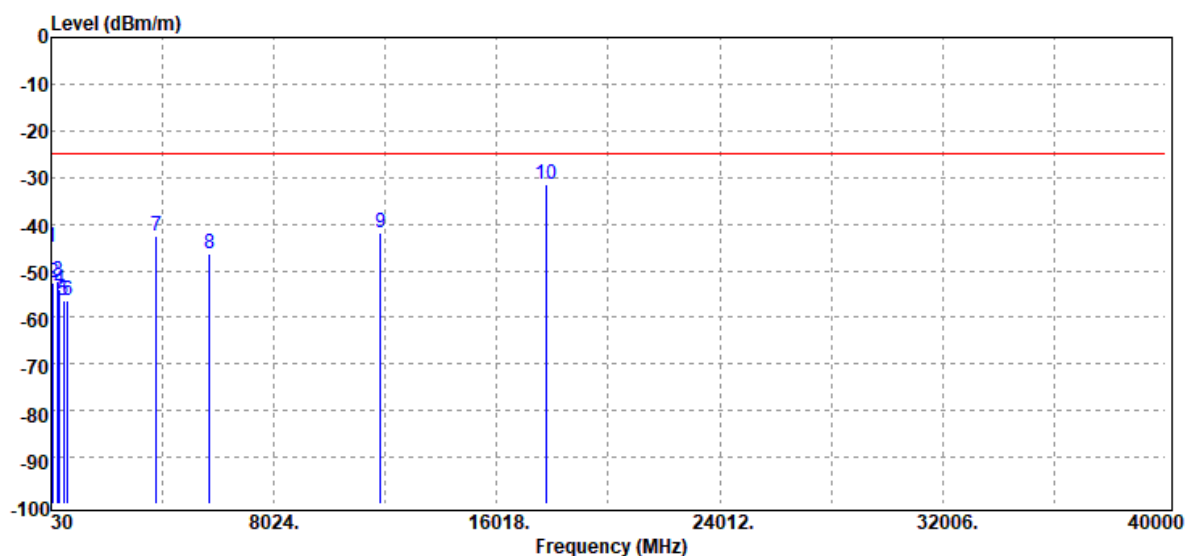
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DSRC + LTE B2

Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B2
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1905 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :VERTICAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.01	-30.64	-13.72	-0.65	-25.00	-20.01
95.96	-52.46	-51.18	-0.28	-1.00	-25.00	-27.46
288.99	-52.12	-54.43	4.04	-1.73	-25.00	-27.12
335.55	-54.11	-56.49	4.28	-1.90	-25.00	-29.11
479.11	-56.52	-58.30	4.21	-2.43	-25.00	-31.52
624.61	-56.25	-57.40	3.49	-2.34	-25.00	-31.25
3810.00	-42.41	-47.12	12.38	-7.67	-25.00	-17.41
5715.00	-46.44	-50.17	12.80	-9.07	-25.00	-21.44
11840.00	-41.99	-42.29	12.62	-12.32	-25.00	-16.99
17760.00	-31.40	-27.10	9.80	-14.10	-25.00	-6.40

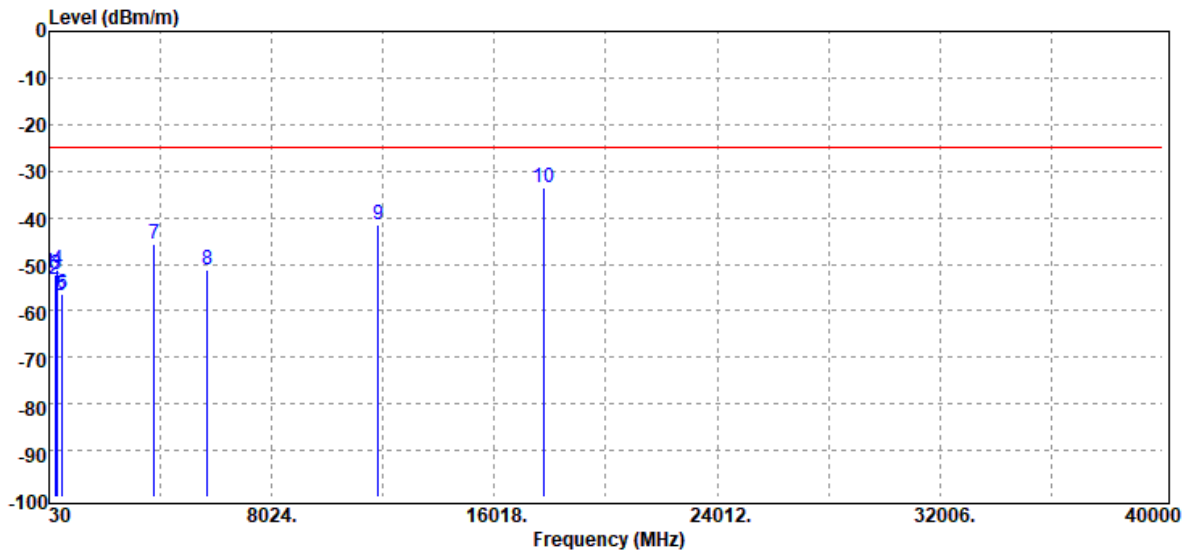
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Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B2
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1905 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-51.98	-37.61	-13.72	-0.65	-25.00	-26.98
240.49	-53.27	-56.04	4.38	-1.61	-25.00	-28.27
288.99	-52.30	-54.61	4.04	-1.73	-25.00	-27.30
335.55	-51.08	-53.46	4.28	-1.90	-25.00	-26.08
479.11	-56.82	-58.60	4.21	-2.43	-25.00	-31.82
500.45	-56.32	-58.16	4.25	-2.41	-25.00	-31.32
3810.00	-45.70	-50.41	12.38	-7.67	-25.00	-20.70
5715.00	-51.37	-55.10	12.80	-9.07	-25.00	-26.37
11840.00	-41.50	-41.80	12.62	-12.32	-25.00	-16.50
17760.00	-33.59	-29.29	9.80	-14.10	-25.00	-8.59

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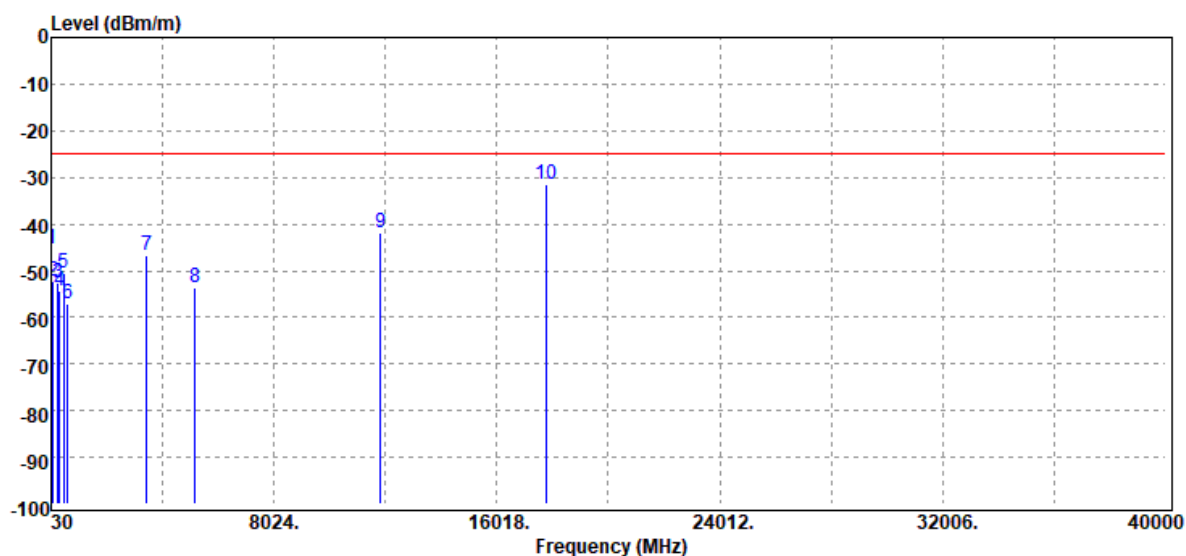
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DSRC + LTE B4

Report Number :ER/2021/50151
 Operation Mode :DSRC_LTE B4
 Test Mode :Tx CH High_Mid
 EUT Pol :H Plane
 Test Frequency :5920 MHz_1732.5 MHz

Test Site :SAC I Chamber
 Test Date :2021-07-12
 Temp./Humi. :27.5/65
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.36	-30.99	-13.72	-0.65	-25.00	-20.36
95.96	-52.22	-50.94	-0.28	-1.00	-25.00	-27.22
288.99	-52.68	-54.99	4.04	-1.73	-25.00	-27.68
335.55	-54.45	-56.83	4.28	-1.90	-25.00	-29.45
479.11	-50.67	-52.45	4.21	-2.43	-25.00	-25.67
623.64	-56.93	-58.08	3.48	-2.33	-25.00	-31.93
3465.00	-46.64	-53.01	12.47	-6.10	-25.00	-21.64
5197.50	-53.52	-58.03	12.39	-7.88	-25.00	-28.52
11840.00	-41.88	-42.18	12.62	-12.32	-25.00	-16.88
17760.00	-31.64	-27.34	9.80	-14.10	-25.00	-6.64

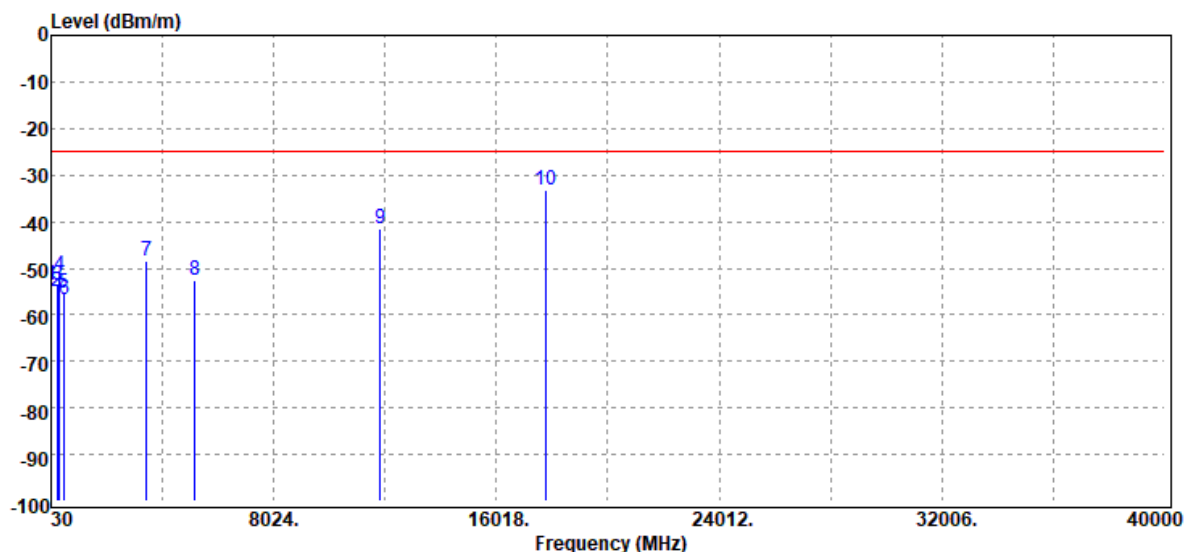
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Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B4
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_1732.5 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-53.55	-39.18	-13.72	-0.65	-25.00	-28.55
240.49	-55.02	-57.79	4.38	-1.61	-25.00	-30.02
288.99	-53.46	-55.77	4.04	-1.73	-25.00	-28.46
335.55	-51.48	-53.86	4.28	-1.90	-25.00	-26.48
479.11	-55.42	-57.20	4.21	-2.43	-25.00	-30.42
500.45	-56.61	-58.45	4.25	-2.41	-25.00	-31.61
3465.00	-48.54	-54.91	12.47	-6.10	-25.00	-23.54
5197.50	-52.71	-57.22	12.39	-7.88	-25.00	-27.71
11840.00	-41.62	-41.92	12.62	-12.32	-25.00	-16.62
17760.00	-33.12	-28.82	9.80	-14.10	-25.00	-8.12

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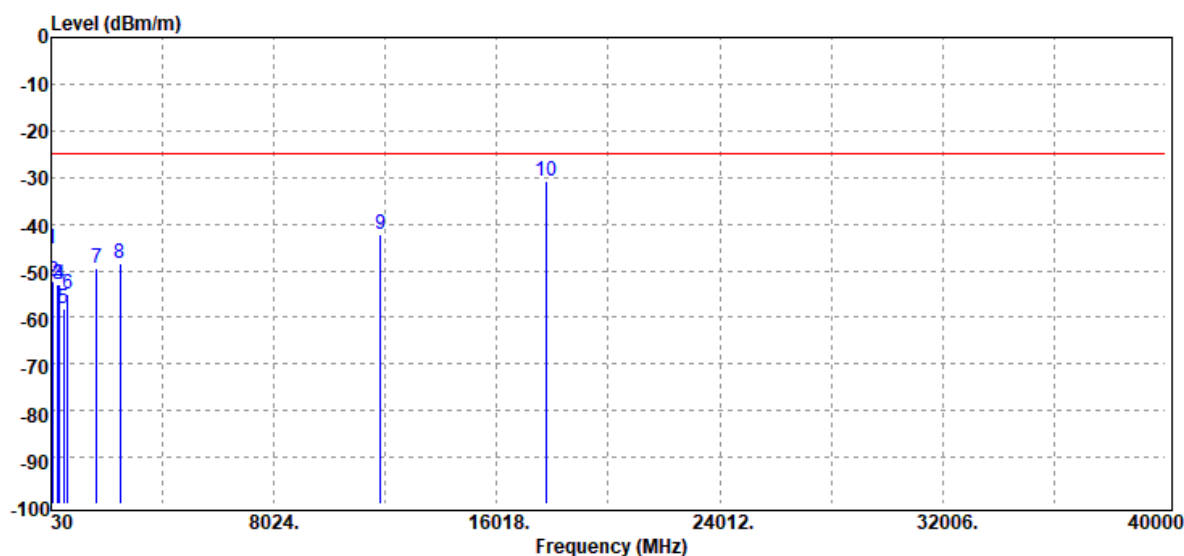
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DSRC + LTE B5

Report Number :ER/2021/50151
 Operation Mode :DSRC_LTE B5
 Test Mode :Tx CH High_Mid
 EUT Pol :H Plane
 Test Frequency :5920 MHz_836.5 MHz

Test Site :SAC I Chamber
 Test Date :2021-07-12
 Temp./Humi. :27.5/65
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.32	-30.95	-13.72	-0.65	-25.00	-20.32
95.96	-52.30	-51.02	-0.28	-1.00	-25.00	-27.30
288.99	-52.86	-55.17	4.04	-1.73	-25.00	-27.86
335.55	-52.86	-55.24	4.28	-1.90	-25.00	-27.86
479.11	-58.03	-59.81	4.21	-2.43	-25.00	-33.03
624.61	-55.08	-56.23	3.49	-2.34	-25.00	-30.08
1673.00	-49.54	-54.80	9.55	-4.29	-25.00	-24.54
2509.50	-48.35	-53.77	10.62	-5.20	-25.00	-23.35
11840.00	-42.12	-42.42	12.62	-12.32	-25.00	-17.12
17760.00	-30.79	-26.49	9.80	-14.10	-25.00	-5.79

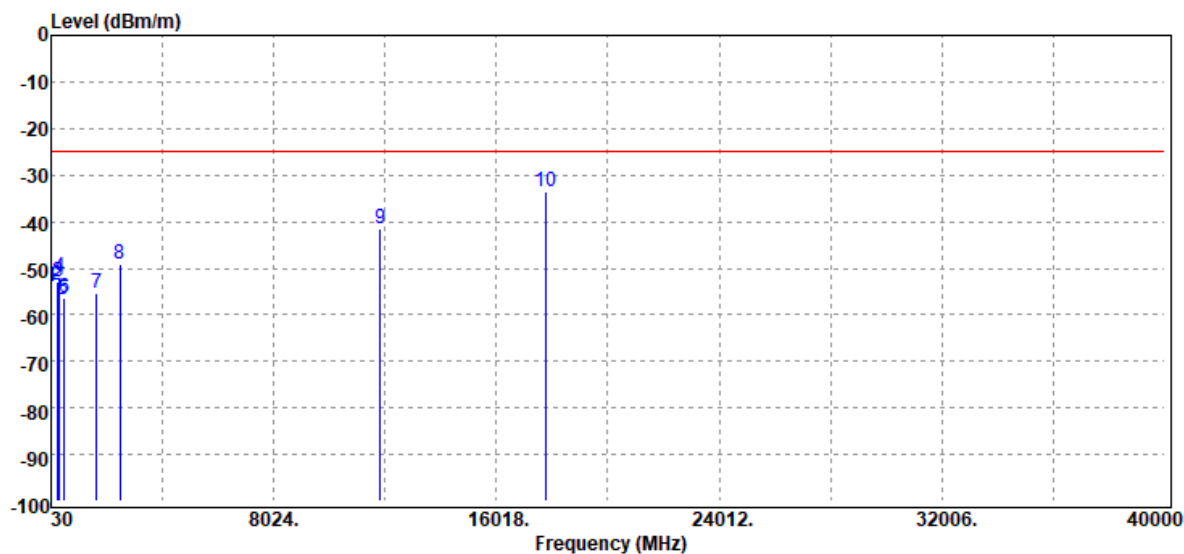
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Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B5
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_836.5 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-54.03	-39.66	-13.72	-0.65	-25.00	-29.03
240.49	-53.55	-56.32	4.38	-1.61	-25.00	-28.55
288.99	-52.99	-55.30	4.04	-1.73	-25.00	-27.99
335.55	-51.93	-54.31	4.28	-1.90	-25.00	-26.93
479.11	-56.86	-58.64	4.21	-2.43	-25.00	-31.86
500.45	-56.24	-58.08	4.25	-2.41	-25.00	-31.24
1673.00	-55.40	-60.66	9.55	-4.29	-25.00	-30.40
2509.50	-49.15	-54.57	10.62	-5.20	-25.00	-24.15
11840.00	-41.59	-41.89	12.62	-12.32	-25.00	-16.59
17760.00	-33.56	-29.26	9.80	-14.10	-25.00	-8.56

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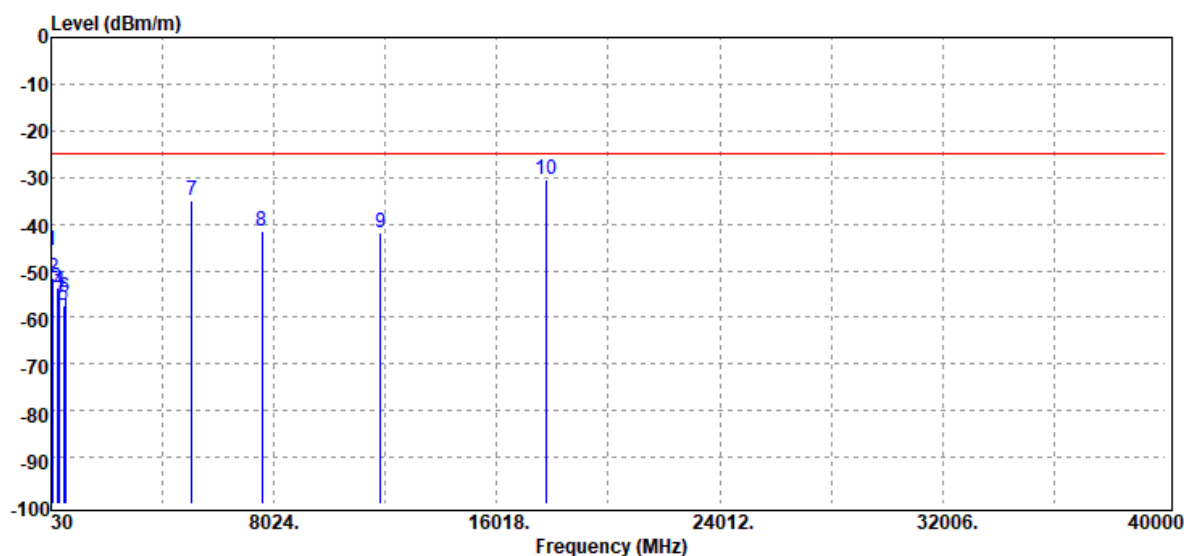
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DSRC + LTE B7

Report Number :ER/2021/50151
 Operation Mode :DSRC_LTE B7
 Test Mode :Tx CH High_Mid
 EUT Pol :H Plane
 Test Frequency :5920 MHz_2535 MHz

Test Site :SAC I Chamber
 Test Date :2021-07-12
 Temp./Humi. :27.5/65
 Antenna Pol. :VERTICAL
 Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-45.85	-31.48	-13.72	-0.65	-25.00	-20.85
95.96	-51.63	-50.35	-0.28	-1.00	-25.00	-26.63
240.49	-53.76	-56.53	4.38	-1.61	-25.00	-28.76
335.55	-54.42	-56.80	4.28	-1.90	-25.00	-29.42
479.11	-57.40	-59.18	4.21	-2.43	-25.00	-32.40
527.61	-55.76	-57.90	4.17	-2.03	-25.00	-30.76
5070.00	-35.06	-39.33	12.10	-7.83	-25.00	-10.06
7605.00	-41.67	-43.27	11.21	-9.61	-25.00	-16.67
11840.00	-41.96	-42.26	12.62	-12.32	-25.00	-16.96
17760.00	-30.59	-26.29	9.80	-14.10	-25.00	-5.59

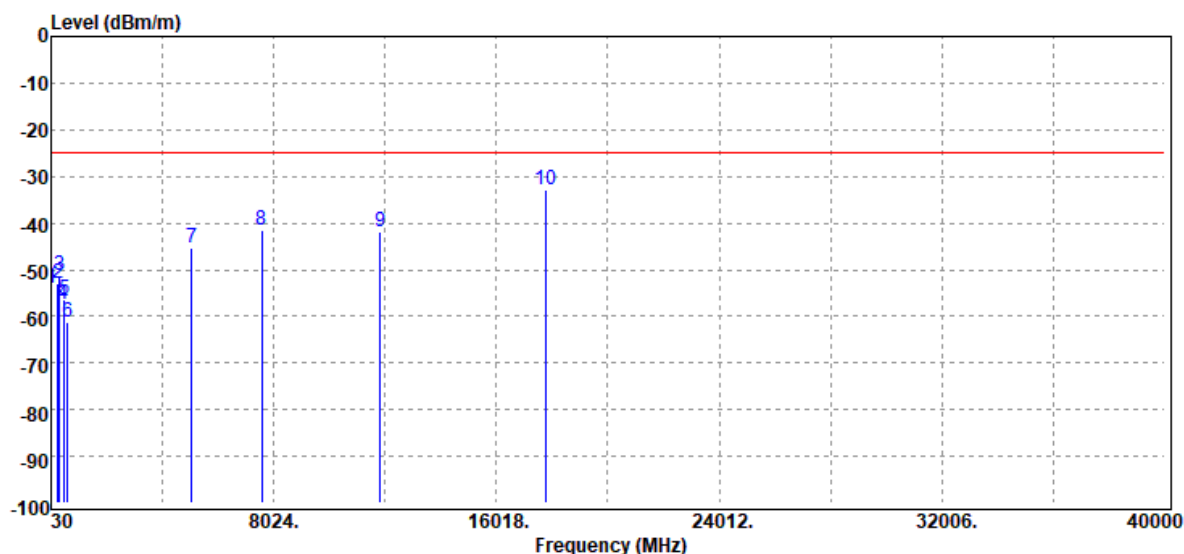
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Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B7
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_2535 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-53.95	-39.58	-13.72	-0.65	-25.00	-28.95
288.99	-52.84	-55.15	4.04	-1.73	-25.00	-27.84
335.55	-51.22	-53.60	4.28	-1.90	-25.00	-26.22
479.11	-57.41	-59.19	4.21	-2.43	-25.00	-32.41
500.45	-56.48	-58.32	4.25	-2.41	-25.00	-31.48
623.64	-61.14	-62.29	3.48	-2.33	-25.00	-36.14
5070.00	-45.21	-49.48	12.10	-7.83	-25.00	-20.21
7605.00	-41.63	-43.23	11.21	-9.61	-25.00	-16.63
11840.00	-41.99	-42.29	12.62	-12.32	-25.00	-16.99
17760.00	-32.94	-28.64	9.80	-14.10	-25.00	-7.94

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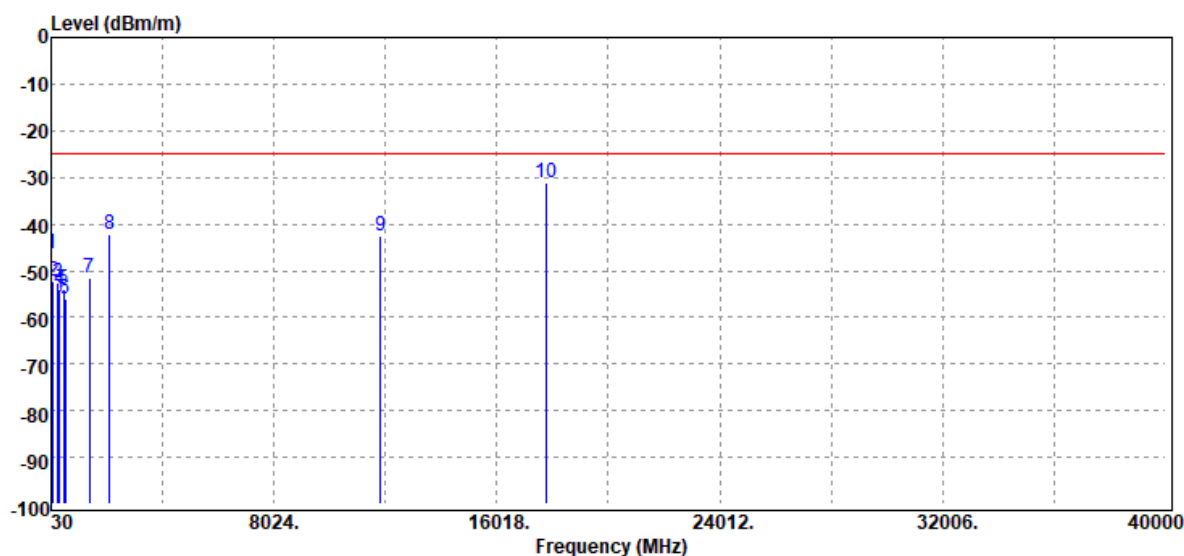
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DSRC + LTE B12

Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B12
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_7075 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :VERTICAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-46.38	-32.01	-13.72	-0.65	-25.00	-21.38
95.96	-52.31	-51.03	-0.28	-1.00	-25.00	-27.31
288.99	-52.47	-54.78	4.04	-1.73	-25.00	-27.47
335.55	-54.11	-56.49	4.28	-1.90	-25.00	-29.11
479.11	-53.97	-55.75	4.21	-2.43	-25.00	-28.97
527.61	-56.07	-58.21	4.17	-2.03	-25.00	-31.07
1415.00	-51.72	-55.58	7.72	-3.86	-25.00	-26.72
2122.50	-42.07	-46.90	9.63	-4.80	-25.00	-17.07
11840.00	-42.59	-42.89	12.62	-12.32	-25.00	-17.59
17760.00	-31.29	-26.99	9.80	-14.10	-25.00	-6.29

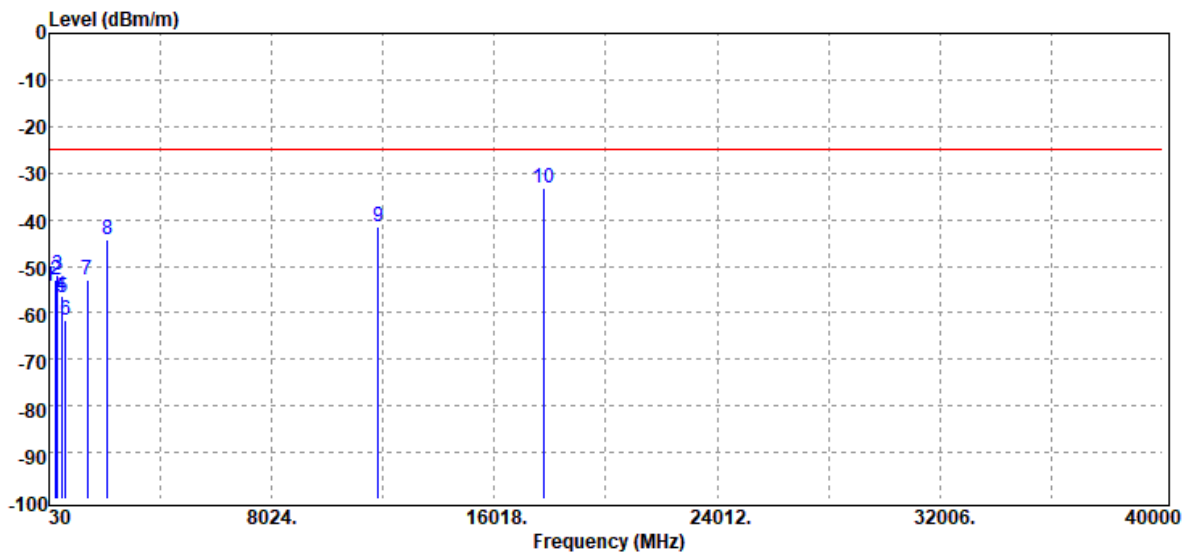
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Report Number :ER/2021/50151
Operation Mode :DSRC_LTE B12
Test Mode :Tx CH High_Mid
EUT Pol :H Plane
Test Frequency :5920 MHz_7075 MHz

Test Site :SAC I Chamber
Test Date :2021-07-12
Temp./Humi. :27.5/65
Antenna Pol. :HORIZONTAL
Engineer :Neo Tsai



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
36.79	-54.32	-39.95	-13.72	-0.65	-25.00	-29.32
288.99	-52.91	-55.22	4.04	-1.73	-25.00	-27.91
335.55	-51.89	-54.27	4.28	-1.90	-25.00	-26.89
479.11	-56.29	-58.07	4.21	-2.43	-25.00	-31.29
500.45	-56.67	-58.51	4.25	-2.41	-25.00	-31.67
624.61	-61.46	-62.61	3.49	-2.34	-25.00	-36.46
1415.00	-52.80	-56.66	7.72	-3.86	-25.00	-27.80
2122.50	-44.21	-49.04	9.63	-4.80	-25.00	-19.21
11840.00	-41.67	-41.97	12.62	-12.32	-25.00	-16.67
17760.00	-33.08	-28.78	9.80	-14.10	-25.00	-8.08

~ End of Report ~

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