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## RADIO TEST REPORT

Report No: STS2201129W04

Issued for

Litum bilgi teknolojileri san. Ve dis tic. A.S

Sevket Ozcelik sok. No29 Alsancak izmir Turkey

<b>Product Name:</b>	430 Collision Warning System
<b>Brand Name:</b>	Litum
<b>Model Name:</b>	430
<b>Series Model:</b>	4300000001, 4300000002, 4300000003
<b>FCC ID:</b>	2AW7W430
<b>IC:</b>	26820-430
<b>Test Standard:</b>	Title 47 of the CFR, Part 15. Subpart F RSS 220 Issue 1, amendment 1 July 2018

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**TEST RESULT CERTIFICATION**

**Applicant's Name** .....: Litum bilgi teknolojileri san. Ve dis tic. A.S  
Address.....: Sevket Ozcelik sok. No29 Alsancak izmir Turkey  
**Manufacture's Name** .....: Litum bilgi teknolojileri san. Ve dis tic. A.S  
Address.....: Sevket Ozcelik sok. No29 Alsancak izmir Turkey

**Product Description**

Product Name .....: 430 Collision Warning System  
Brand Name .....: Litum  
Model Name.....: 430  
Series Model .....: 4300000001, 4300000002, 4300000003  
**Test Standards**.....: Title 47 of the CFR, Part 15. Subpart F  
RSS 220 Issue 1, amendment 1 July 2018  
RSS-Gen Issue 5, Amendment 1, March 2019  
Test Procedure .....: ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC/IC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:  
Date of receipt of test item.....: 22 Feb. 2022  
Date of performance of tests ...: 22 Feb. 2022 ~ 03 Mar. 2022  
Date of Issue.....: 03 Mar. 2022  
Test Result .....: **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	03 Mar. 2022	STS2201129W04	ALL	Initial Issue





## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>FCC Part 15. Subpart F RSS 220 Issue 1, amendment 1 July 2018</b>			
Standard Section	Test Item	Judgment	Remark
15.207 RSS-Gen (8.8)	AC Power Conducted Emission	N/A	
15.203 RSS-Gen (6.8)	Antenna Requirement	Pass	
15.209 15.517(c) RSS-220 (3.4) RSS-220 (5.2.1(d))	Radiated Spurious Emission	Pass	
15.209 15.517(d) RSS-220 (5.2.1(e))	Radiated Spurious Emission in GPS Band	Pass	
15.517(e) RSS-220 (5.2.1(g))	Peak Emissions within a 50MHz Bandwidth	Pass	
15.517(b) RSS-220 (2)	UWB Bandwidth	Pass	
RSS-Gen 6.7	99% Bandwidth	Pass	

**NOTE:**

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2013.



### 1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

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FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.87\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.895\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 3.80\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 4.09\text{dB}$
5	All emissions, radiated 1G-6GHz	$\pm 4.92\text{dB}$
6	All emissions, radiated >6G	$\pm 5.49\text{dB}$
7	Conducted Emission (9KHz-30MHz)	$\pm 2.73\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name/PMN	430 Collision Warning System
Trade Name	Litum
Model Name/HVIN	430
Series Model/HVIN	4300000001, 4300000002, 4300000003
Model Difference	Only difference in model name.
Product Description	430 Collision Warning System belongs to FCC Part15.517 indoor UWB systems.
	Operation Frequency: 6489.6MHz
	Modulation Type: BPM with BPSK
	Antenna Designation: Please refer to the Note 3.
	Antenna Gain(Peak): Ceramic antenna
Based on the application, features, or specification exhibited in User Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User Manual.	
Channel List	Please refer to the Note 2.
Rating	Input: 9-30V
Hardware version number	AFA01-01-02
Software version number/FVIN	1.15.15.0
Serial Numbers	4300000003
Connecting I/O Port(s)	Please refer to the Note 1.

Note:

- For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.

- | Test channel | Frequency(GHz) | Test channel | Frequency(GHz) |
|--------------|----------------|--------------|----------------|
| 1            | 6489.6         | -            | -              |

- Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	Litum	430	Ceramic	N/A	3.3	Antenna

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.

## 2.2 DESCRIPTION OF THE TEST MODES

For Radiated spurious emissions

Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

Pretest Mode	Description	Modulation
Mode 1	TX	BPM with BPSK

Note:

(1) All above mode have been measurement, only worst data was reported.

## 2.3 TEST SOFTWARE AND POWER LEVEL

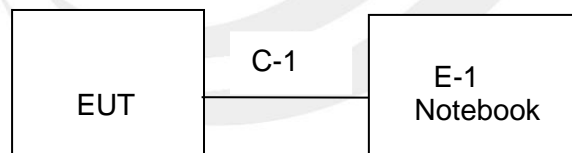
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

RF Function	Type	Mode Or Modulation type	Ant Gain(dBi)	Power Class	Software For Testing
UWB	6849.6MHz	BPM with BPSK	3.3	8	Tera Term

## 2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters.

Radiated Spurious Emission Test







## 2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

### Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

### Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	Notebook	LENOVO	Think Pad E470	N/A	N/A
C-1	USB Cable	N/A	N/A	150cm	NO

#### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



## 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

## Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2023.04.10
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK201808090 1	2021.09.30	2022.09.29
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

## RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Analyzer	Agilent	N9020A	MY51110105	2021.03.04	2022.03.03
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	LZ-RF /LzRf-3A3			



### 3. EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.207&RSS-Gen (8.8) limit in the table below has to be followed.

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of “\*” marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

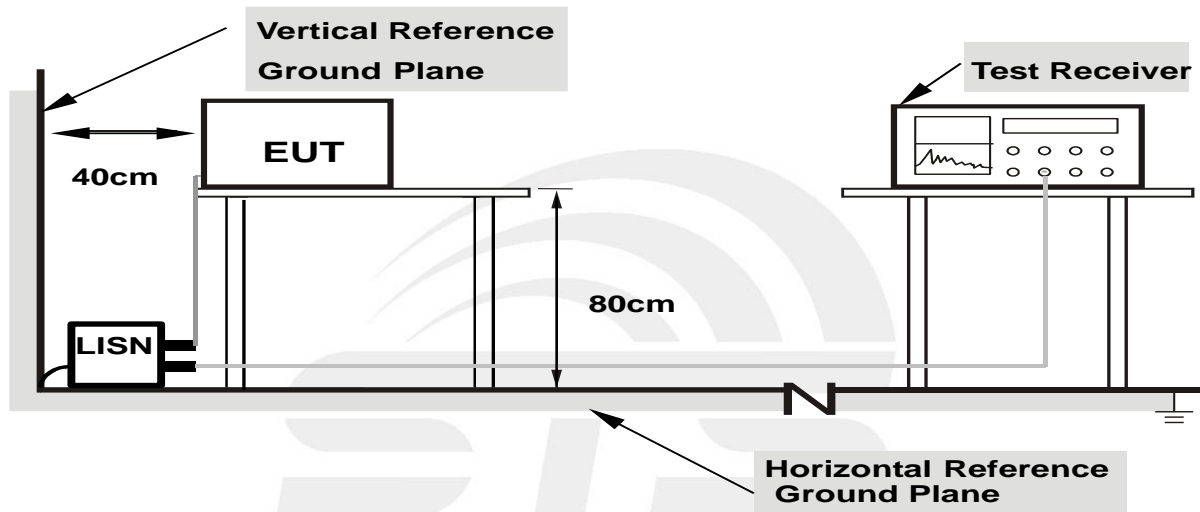
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

### 3.1.2 TEST PROCEDURE

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 TEST SETUP



- Note: 1.Support units were connected to second LISN.**  
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

### 3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 3.1.5 TEST RESULT

Temperature:	N/A	Relative Humidity:	N/A
Test Voltage:	N/A	Phase:	L/N
Test Mode:	N/A		

Note: EUT is only power by DC Power, So it is not applicable for this test.



### 3.2 RADIATED EMISSION MEASUREMENT (FOR 15.517(c)&RSS 220 5.2.1(d))

#### 3.2.1 RADIATED EMISSION LIMITS

The radiated emissions at or below 960MHz from a device operating under the provisions of this section shall not exceed the emission levels in Section 15.209&RSS 220(3.4).

Frequencies (MHz)	Field Strength (micorvolts/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

Note: 1. The lower limit shall apply at the transition frequencies.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

For FCC:

The radiated emissions above 960MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1MHz:

Frequency of Emission (MHz)	EIRP (dBm)	Field Strength (dBuV/m@3m)	Field Strength (dBuV/m@1m)
960~1610	-75.3	19.9	29.44
1610~1990	-53.3	41.9	51.44
1990~3100	-51.3	43.9	53.44
3100~10600	-41.3	53.9	63.44
Above 10600	-51.3	43.9	53.44

Notes: 1. Transfer rules follow 15.521(g),15.31(f)(1).

2. 15.521(c) Emissions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in Section 15.209 of this chapter, rather than the limits specified in this subpart.

3.  $E(\text{dBuV/m})@3\text{m} = P(\text{dBm EIRP}) + 95.2;$

$E(\text{dBuV/m})@1\text{m} = E(\text{dBuV/m})@3\text{m} + 20 \cdot \log(3/1)$



For IC:

The radiated emissions above 960MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1MHz:

Frequency of Emission (MHz)	EIRP (dBm)	Field Strength (dBuV/m@3m)	Field Strength (dBuV/m@1m)
960~1610	-75.3	19.9	29.44
1610~4750	-70.0	25.2	34.74
4750~10600	-41.3	53.9	63.44
Above 10600	-51.3	43.9	53.44

- Notes: 1. Transfer rules follow section 2 of the RSS 220 Annex.  
 2. The Emissions from digital circuitry used to enable the operation of the UWB transmitter shall comply with the limits in Section RSS 220(3.4) of this chapter, rather than the limits specified in this subpart.  
 3.  $E(\text{dBuV/m})@3\text{m} = P(\text{dBm EIRP}) + 95.2$ ;  
 $E(\text{dBuV/m})@1\text{m} = E(\text{dBuV/m})@3\text{m} + 20 \cdot \log(3/1)$

Spectrum Parameter	Setting
Detector	RMS
Attenuation	Auto
Start Frequency	960 MHz
Stop Frequency	10th of the highest fundamental frequency or to 40 GHz, whichever is lower
RB	1MHz
VB	3MHz
Sweep Point	1001
SweepTime	1s

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
	90kHz~110kHz / RB 200Hz for QP
	110kHz~490kHz / RB 200Hz for PK & AV
	490kHz~30MHz / RB 9kHz for QP
	30MHz~960MHz / RB 120kHz for QP



### 3.2.2 TEST PROCEDURE

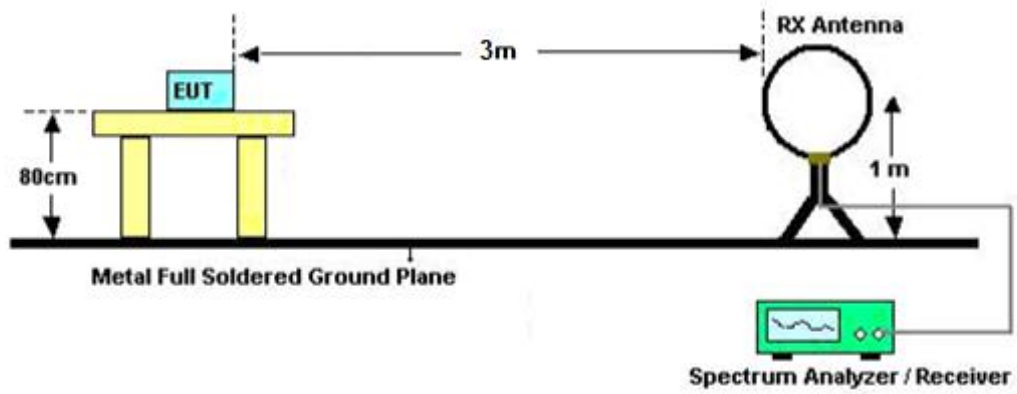
- a. The measuring distance of 1m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8meter (above 1GHz is 1.5 m) above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- c. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- d. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform (Below 960MHz)
- e. All readings are RMS mode value, for each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. (Above 960MHz)
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.  
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

### 3.2.3 DEVIATION FROM TEST STANDARD

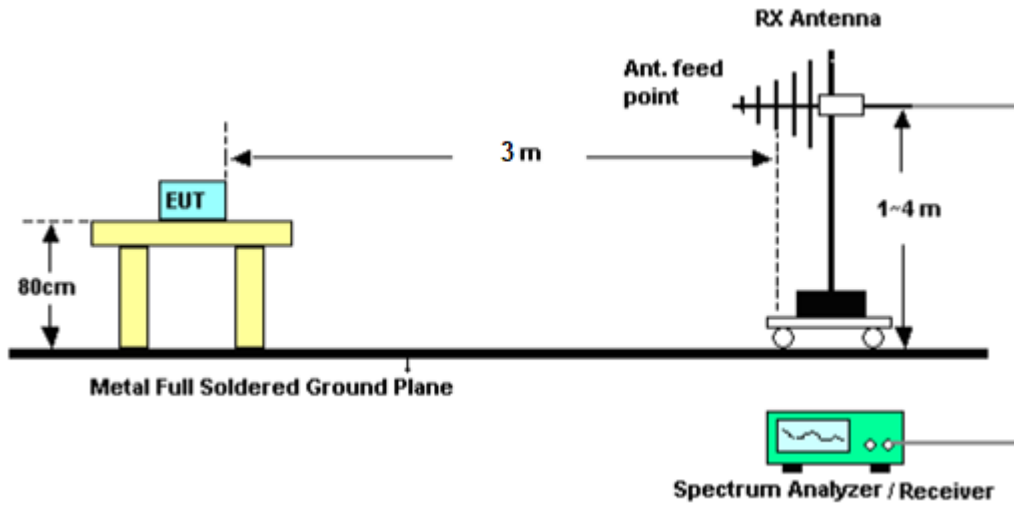
No deviation

### 3.2.4 TEST SETUP

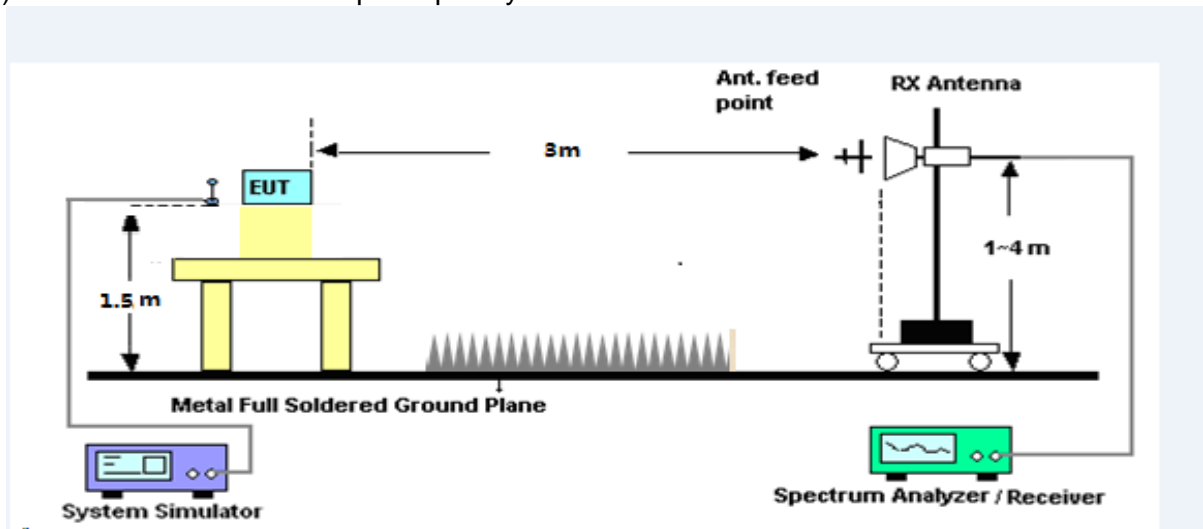
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



#### (C) Radiated Emission Test-Up Frequency Above 1GHz





### 3.2.5 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:

Margin=PL-PK L or AL- AV L; Margin only shown the worst case.

Where

PR = Peak Reading

AR = Average Reading

PL = Peak Level

AL = Average Level

AF = Antenna Factor

PK L = Peak Limit

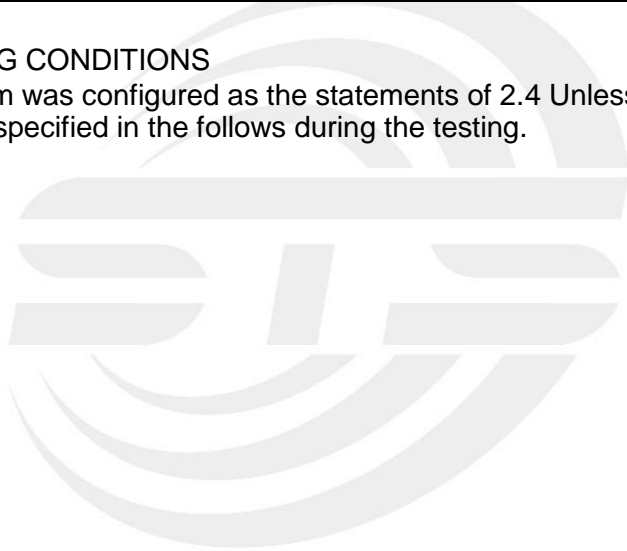
AV L = AV Limit

For example

Frequency	PR	AR	AF	PL	AL	PK L	AV L	Margin
(MHz)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)
2178	40.23	30.31	9.83	50.06	40.14	74.00	54.00	-13.86

### 3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.





### 3.2.7 TEST RESULTS

Below 30MHz

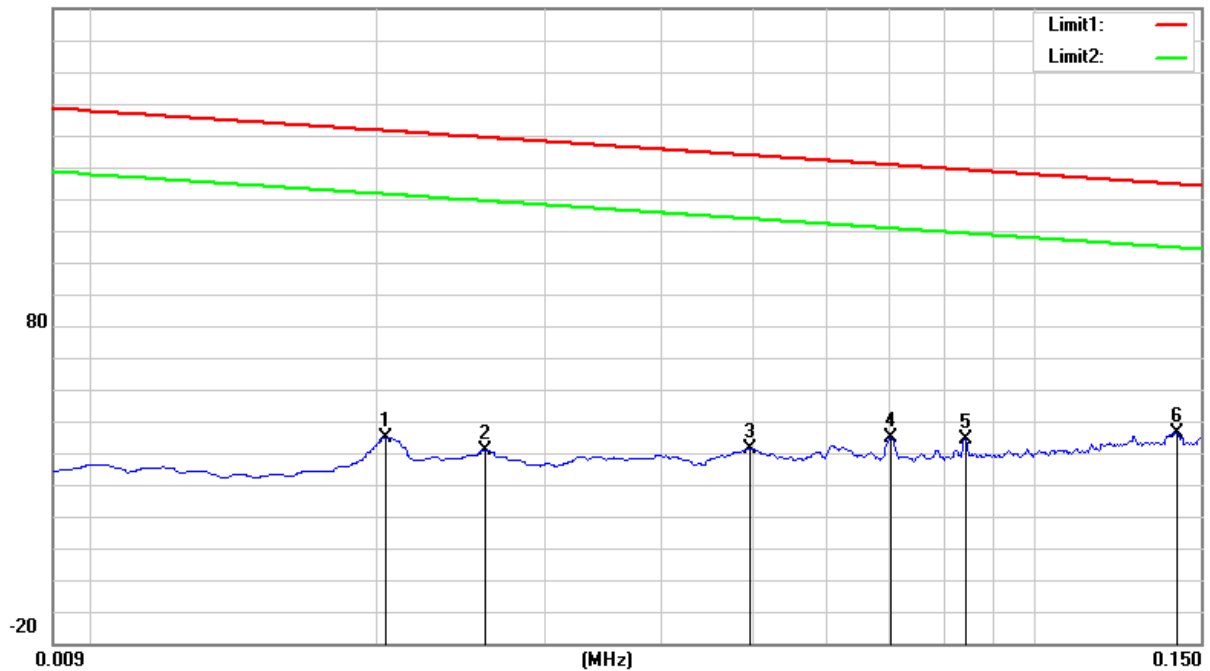
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Test Mode:	CH 1(9KHz - 150KHz)
Test distance:	3m		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0204	24.74	20.09	44.83	121.41	-76.58	AVG
2	0.0260	20.75	19.98	40.73	119.3	-78.57	AVG
3	0.0497	21.76	19.51	41.27	113.68	-72.41	AVG
4	0.0701	25.92	18.94	44.86	110.69	-65.83	AVG
5	0.0843	25.94	18.35	44.29	109.09	-64.8	AVG
6	0.1414	28.97	17.52	46.49	104.59	-58.1	AVG

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

180.0 dBuV/m



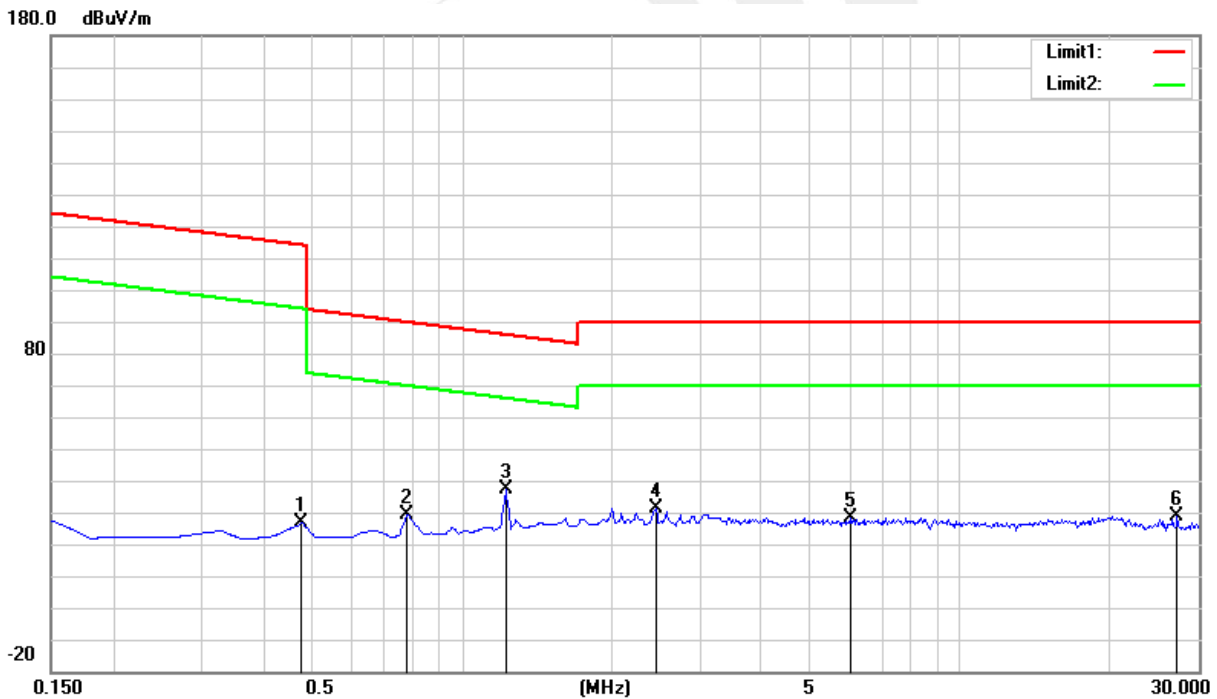


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Test Mode:	CH 1 (150KHz – 30MHz)
Test distance:	3m		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.4783	6.38	20.19	26.57	94.01	-67.44	AVG
2	0.7768	9.01	20.29	29.30	69.80	-40.50	QP
3	1.2245	17.04	20.24	37.28	65.85	-28.57	QP
4	2.4484	11.14	20.27	31.41	69.54	-38.13	QP
5	6.0006	7.92	20.44	28.36	69.54	-41.18	QP
6	27.1642	8.35	20.43	28.78	69.54	-40.76	QP

Remark:

1. Margin = Result (Result =Reading + Factor) –Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



Note: The position of the measurement polarization (Horizontal / Face-on / Face-off) all has been tested, only shown the worst mode of Horizontal position.



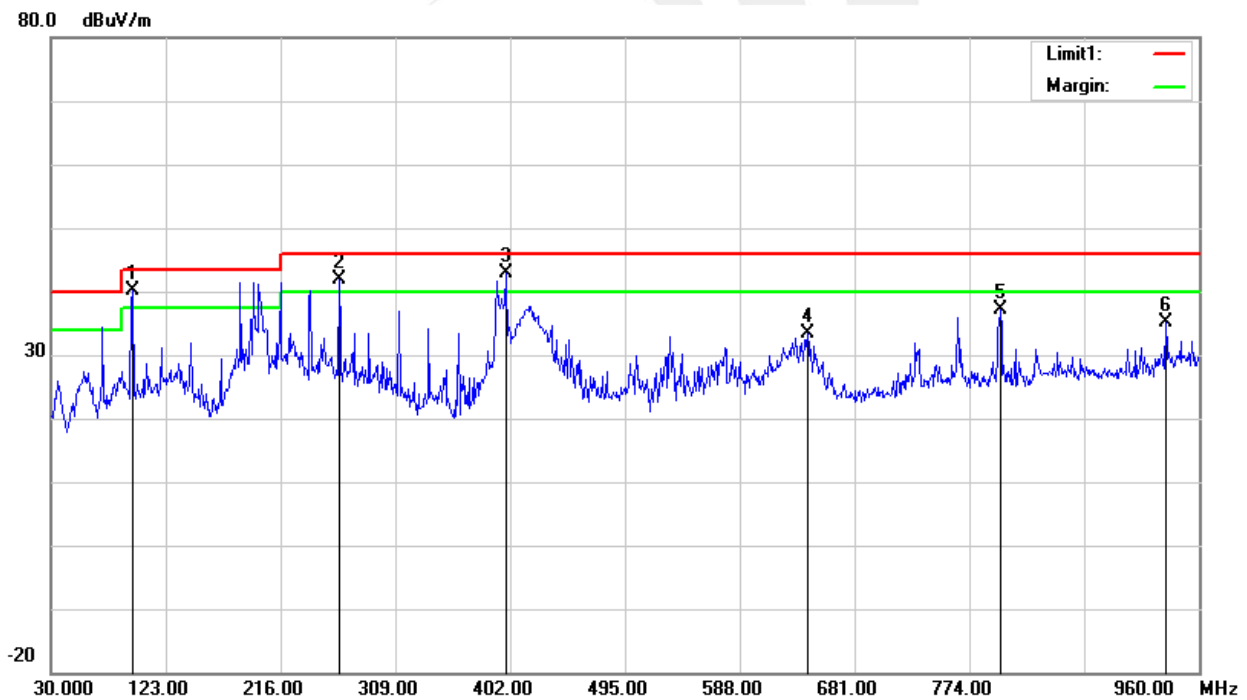
30MHz – 960MHz Radiation Spurious

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1	Test distance:	3m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	96.0300	60.91	-20.67	40.24	43.50	-3.26	QP
2	263.4300	56.72	-14.75	41.97	46.00	-4.03	QP
3	398.2800	53.99	-11.21	42.78	46.00	-3.22	QP
4	642.8700	38.22	-4.85	33.37	46.00	-12.63	QP
5	799.1100	39.20	-2.04	37.16	46.00	-8.84	QP
6	933.0300	34.26	0.80	35.06	46.00	-10.94	QP

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



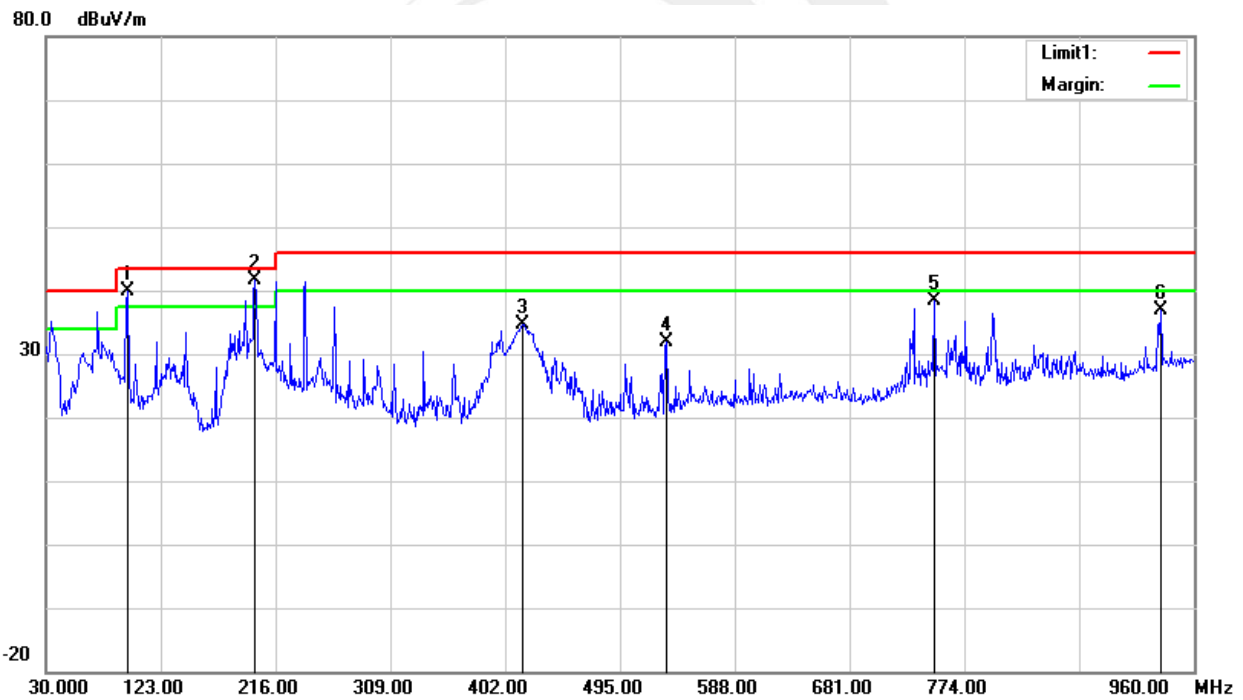


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1	Test distance:	3m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	96.0300	60.54	-20.67	39.87	43.50	-3.63	QP
2	199.2600	62.63	-21.11	41.52	43.50	-1.98	QP
3	415.9500	44.86	-10.28	34.58	46.00	-11.42	QP
4	533.1300	39.16	-7.27	31.89	46.00	-14.11	QP
5	749.8200	40.62	-2.16	38.46	46.00	-7.54	QP
6	933.0300	36.17	0.80	36.97	46.00	-9.03	QP

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





Above 960MHz Radiation Spurious

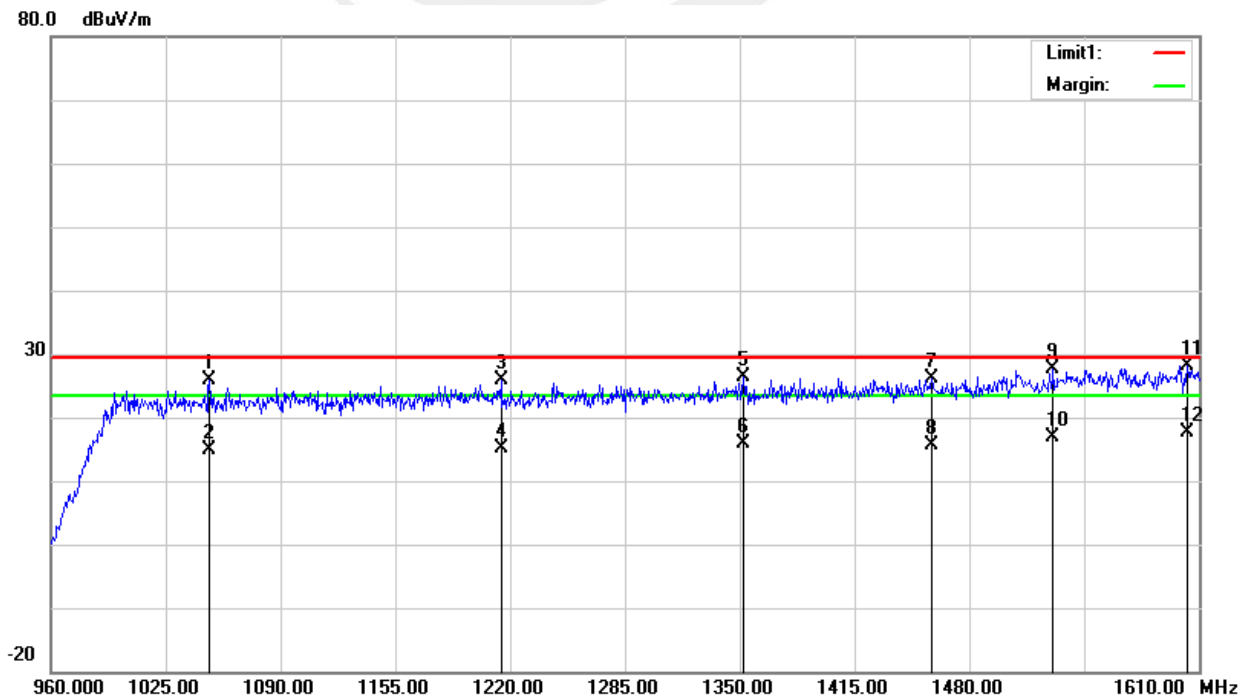
FCC:

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(960MHz -1610MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1049.700	27.14	-1.37	25.77	29.44	-3.67	peak
2	1049.700	16.26	-1.37	14.89	29.44	-14.55	RMS
3	1214.800	26.44	-0.44	26.00	29.44	-3.44	peak
4	1214.800	15.69	-0.44	15.25	29.44	-14.19	RMS
5	1351.950	26.22	0.07	26.29	29.44	-3.15	peak
6	1351.950	15.88	0.07	15.95	29.44	-13.49	RMS
7	1458.550	25.08	0.99	26.07	29.44	-3.37	peak
8	1458.550	14.75	0.99	15.74	29.44	-13.70	RMS
9	1527.450	25.43	2.13	27.56	29.44	-1.88	peak
10	1527.450	14.72	2.13	16.85	29.44	-12.59	RMS
11	1603.500	24.00	4.24	28.24	29.44	-1.20	peak
12	1603.500	13.40	4.24	17.64	29.44	-11.80	RMS

Remark:

1. Margin = Result (Result =Reading + Factor) –Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





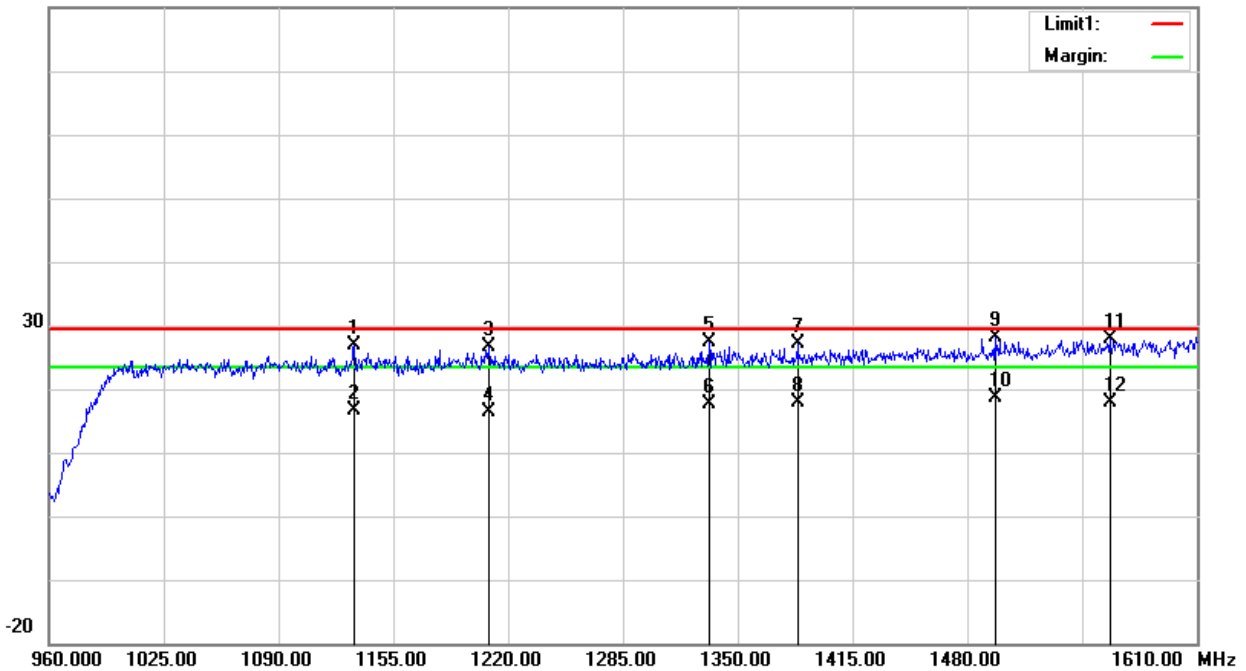
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(960MHz -1610MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1132.900	27.97	-0.97	27.00	29.44	-2.44	peak
2	1132.900	17.51	-0.97	16.54	29.44	-12.90	RMS
3	1208.950	27.12	-0.43	26.69	29.44	-2.75	peak
4	1208.950	16.71	-0.43	16.28	29.44	-13.16	RMS
5	1333.750	27.27	-0.01	27.26	29.44	-2.18	peak
6	1333.750	17.65	-0.01	17.64	29.44	-11.80	RMS
7	1383.800	26.82	0.20	27.02	29.44	-2.42	peak
8	1383.800	17.65	0.20	17.85	29.44	-11.59	RMS
9	1495.600	26.69	1.42	28.11	29.44	-1.33	peak
10	1495.600	17.18	1.42	18.60	29.44	-10.84	RMS
11	1560.600	24.99	3.00	27.99	29.44	-1.45	peak
12	1560.600	14.96	3.00	17.96	29.44	-11.48	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m



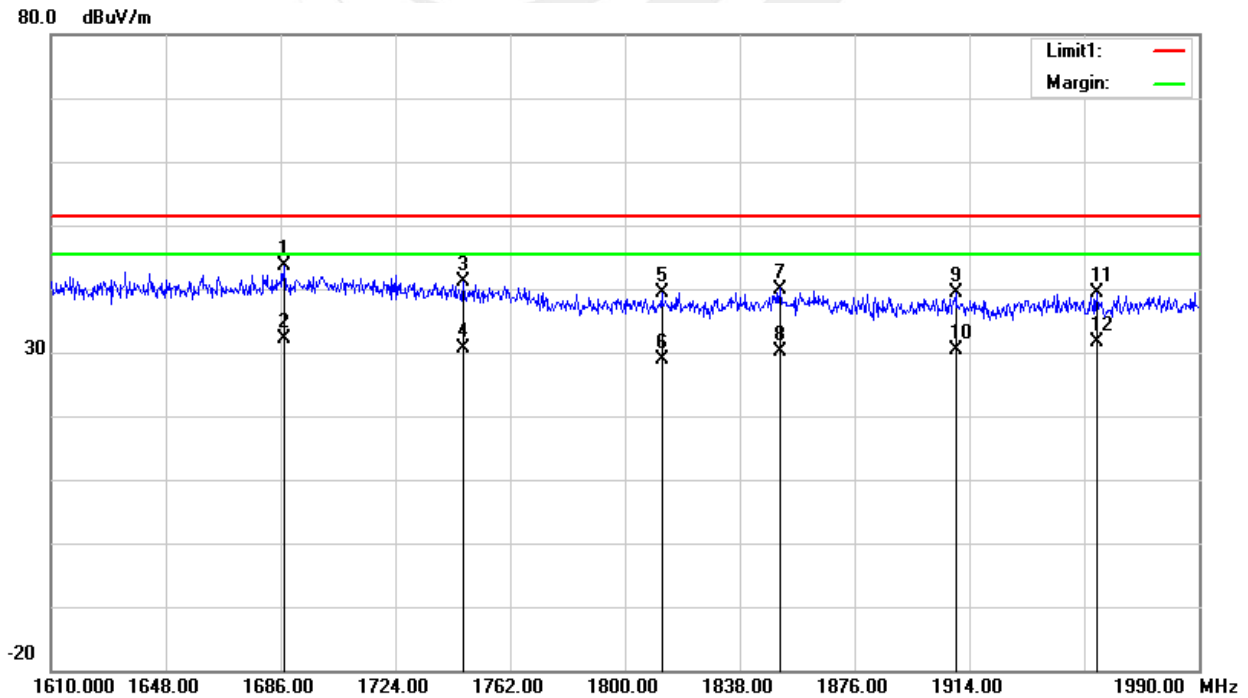


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(1610MHz – 1990MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1687.140	38.67	4.96	43.63	51.44	-7.81	peak
2	1687.140	27.22	4.96	32.18	51.44	-19.26	RMS
3	1746.420	37.42	3.77	41.19	51.44	-10.25	peak
4	1746.420	26.75	3.77	30.52	51.44	-20.92	RMS
5	1812.160	37.47	1.91	39.38	51.44	-12.06	peak
6	1812.160	27.05	1.91	28.96	51.44	-22.48	RMS
7	1851.300	37.67	2.33	40.00	51.44	-11.44	peak
8	1851.300	27.92	2.33	30.25	51.44	-21.19	RMS
9	1909.440	37.84	1.47	39.31	51.44	-12.13	peak
10	1909.440	29.00	1.47	30.47	51.44	-20.97	RMS
11	1956.180	37.90	1.58	39.48	51.44	-11.96	peak
12	1956.180	30.00	1.58	31.58	51.44	-19.86	RMS

Remark:

1. Margin = Result (Result =Reading + Factor )–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





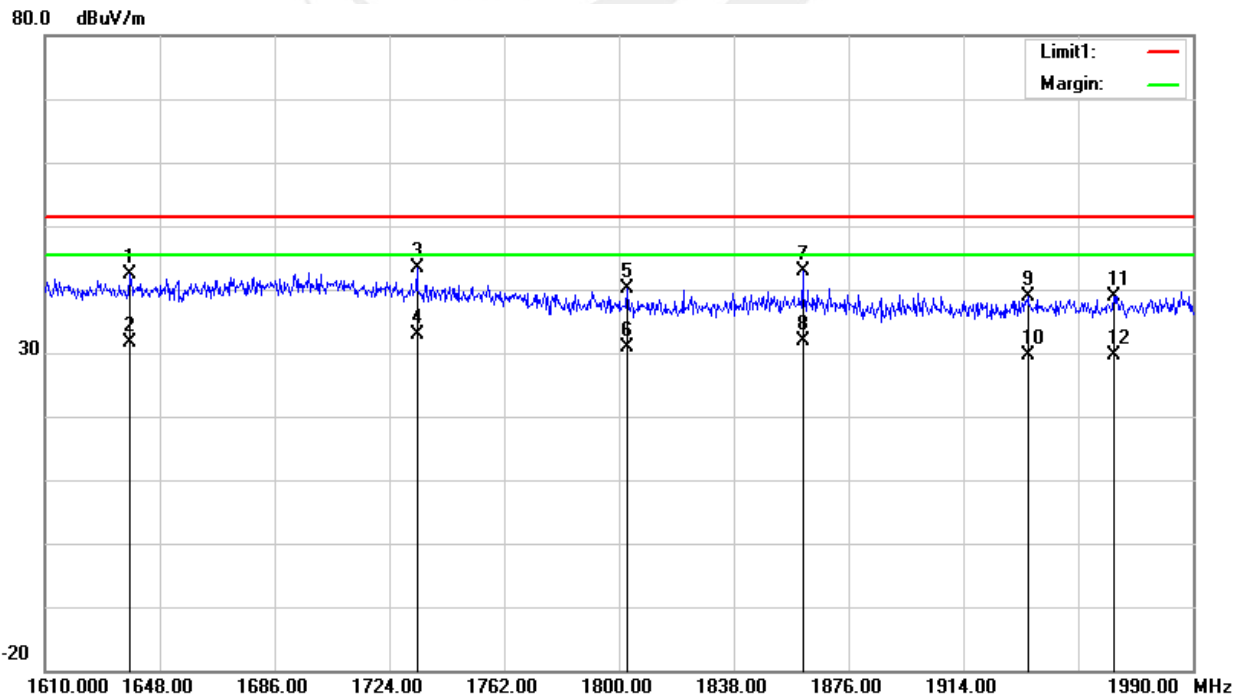


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(1610MHz – 1990MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1638.120	38.03	4.24	42.27	51.44	-9.17	peak
2	1638.120	27.34	4.24	31.58	51.44	-19.86	RMS
3	1733.120	39.12	4.19	43.31	51.44	-8.13	peak
4	1733.120	28.59	4.19	32.78	51.44	-18.66	RMS
5	1802.660	38.43	1.80	40.23	51.44	-11.21	peak
6	1802.660	29.05	1.80	30.85	51.44	-20.59	RMS
7	1860.800	40.63	2.16	42.79	51.44	-8.65	peak
8	1860.800	29.69	2.16	31.85	51.44	-19.59	RMS
9	1935.280	37.48	1.51	38.99	51.44	-12.45	peak
10	1935.280	28.01	1.51	29.52	51.44	-21.92	RMS
11	1963.780	37.33	1.66	38.99	51.44	-12.45	peak
12	1963.780	28.08	1.66	29.74	51.44	-21.70	RMS

Remark:

- Margin = Result (Result =Reading + Factor )–Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





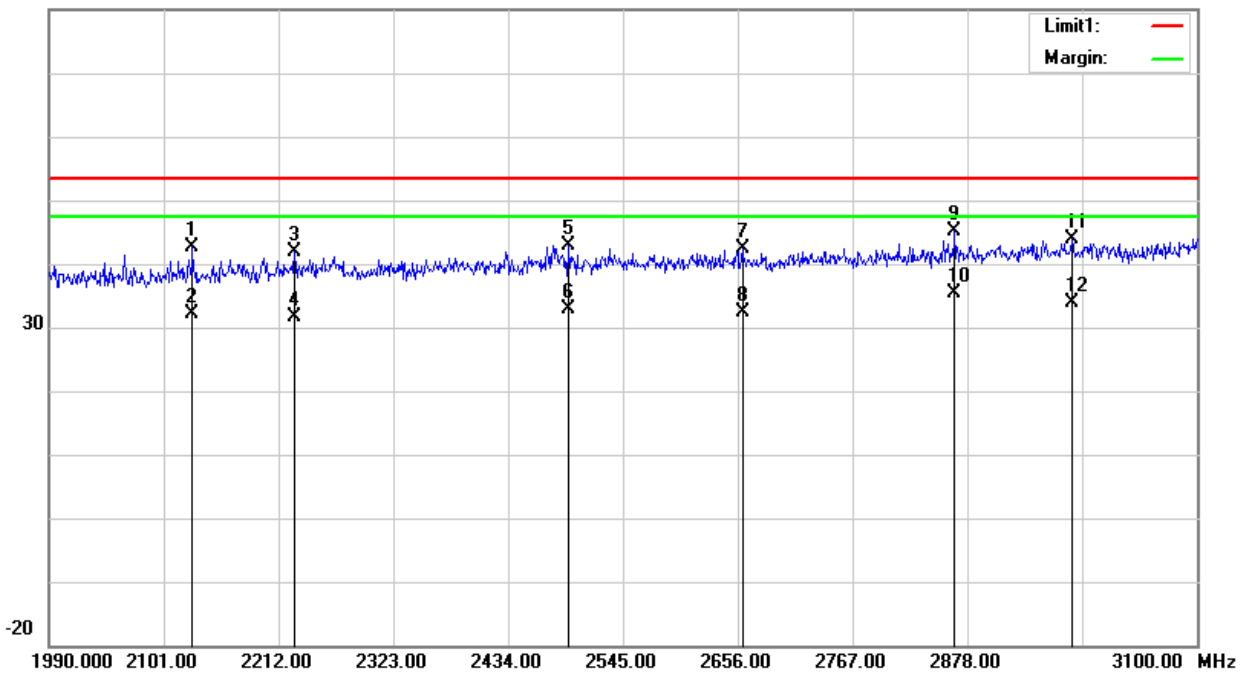
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(1990MHz – 3100MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2128.750	39.78	2.92	42.70	53.44	-10.74	peak
2	2128.750	29.23	2.92	32.15	53.44	-21.29	RMS
3	2227.540	38.38	3.39	41.77	53.44	-11.67	peak
4	2227.540	28.19	3.39	31.58	53.44	-21.86	RMS
5	2492.830	38.24	4.64	42.88	53.44	-10.56	peak
6	2492.830	28.31	4.64	32.95	53.44	-20.49	RMS
7	2660.440	36.83	5.56	42.39	53.44	-11.05	peak
8	2660.440	26.89	5.56	32.45	53.44	-20.99	RMS
9	2865.790	38.43	6.61	45.04	53.44	-8.40	peak
10	2865.790	28.81	6.61	35.42	53.44	-18.02	RMS
11	2979.010	36.90	7.01	43.91	53.44	-9.53	peak
12	2979.010	26.90	7.01	33.91	53.44	-19.53	RMS

Remark:

- Margin = Result (Result =Reading + Factor )–Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





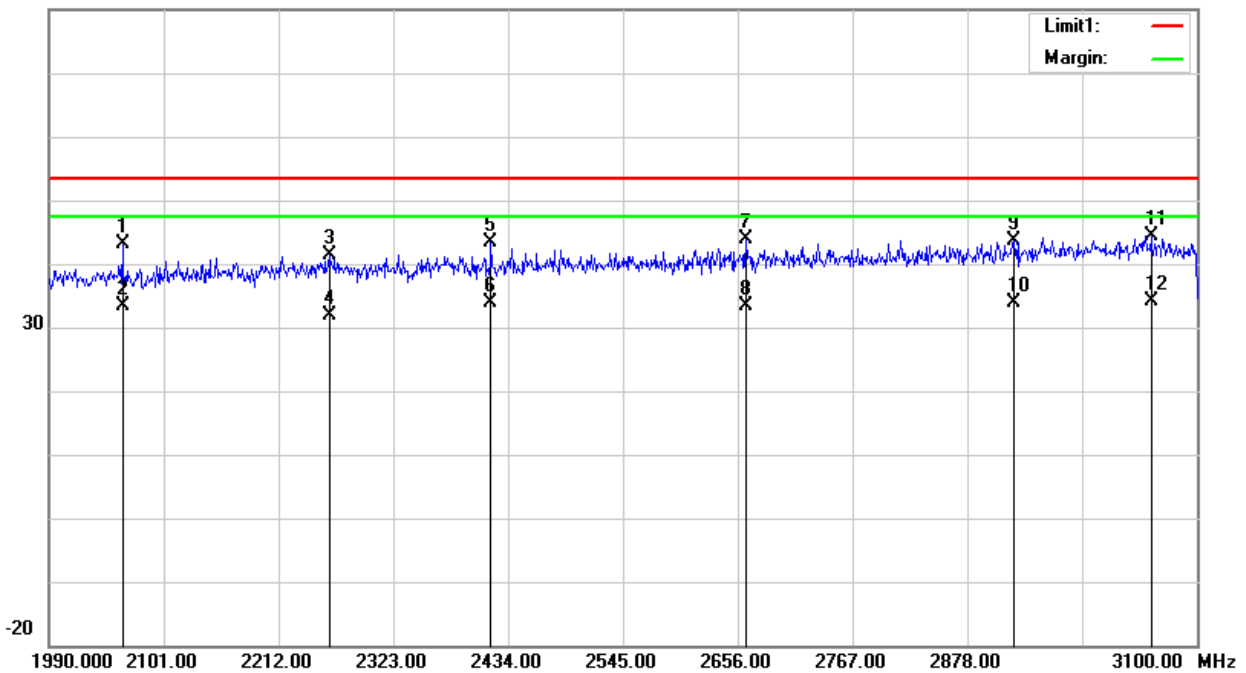
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(1990MHz – 3100MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2061.040	40.97	2.17	43.14	53.44	-10.30	peak
2	2061.040	31.28	2.17	33.45	53.44	-19.99	RMS
3	2260.840	37.55	3.71	41.26	53.44	-12.18	peak
4	2260.840	28.14	3.71	31.85	53.44	-21.59	RMS
5	2417.350	38.91	4.50	43.41	53.44	-10.03	peak
6	2417.350	29.46	4.50	33.96	53.44	-19.48	RMS
7	2663.770	38.42	5.57	43.99	53.44	-9.45	peak
8	2663.770	27.92	5.57	33.49	53.44	-19.95	RMS
9	2923.510	36.84	6.84	43.68	53.44	-9.76	peak
10	2923.510	27.01	6.84	33.85	53.44	-19.59	RMS
11	3055.600	16.14	28.23	44.37	53.44	-9.07	peak
12	3055.600	5.95	28.23	34.18	53.44	-19.26	RMS

Remark:

1. Margin = Result (Result =Reading + Factor )-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m



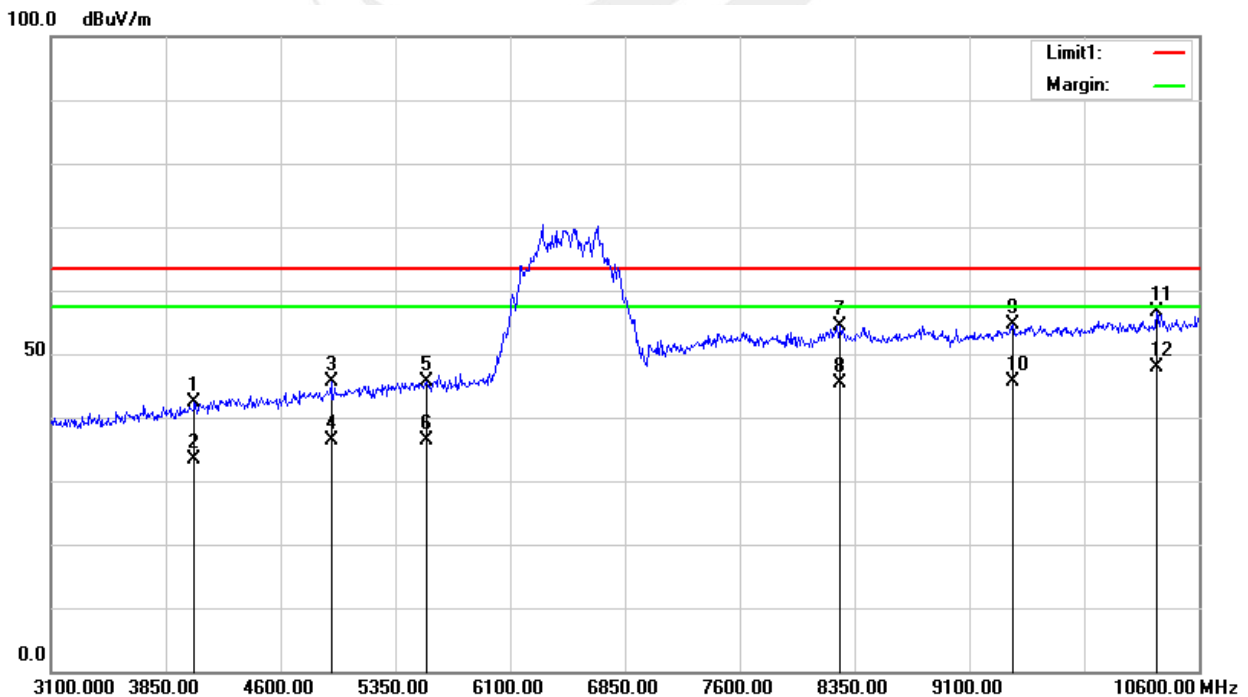


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1 (3100MHz – 10600MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4037.500	51.92	-9.44	42.48	63.44	-20.96	peak
2	4037.500	42.89	-9.44	33.45	63.44	-29.99	RMS
3	4930.000	52.16	-6.65	45.51	63.44	-17.93	peak
4	4930.000	43.13	-6.65	36.48	63.44	-26.96	RMS
5	5552.500	50.40	-4.86	45.54	63.44	-17.90	peak
6	5552.500	41.34	-4.86	36.48	63.44	-26.96	RMS
7	8252.500	51.87	2.45	54.32	63.44	-9.12	peak
8	8252.500	42.82	2.45	45.27	63.44	-18.17	RMS
9	9385.000	51.70	2.98	54.68	63.44	-8.76	peak
10	9385.000	42.64	2.98	45.62	63.44	-17.82	RMS
11	10322.500	52.32	4.40	56.72	63.44	-6.72	peak
12	10322.500	43.45	4.40	47.85	63.44	-15.59	RMS

Remark:

- Margin = Result (Result = Reading + Factor) - Limit
- Factor = Antenna factor + Cable attenuation factor (cable loss) - Amplifier gain





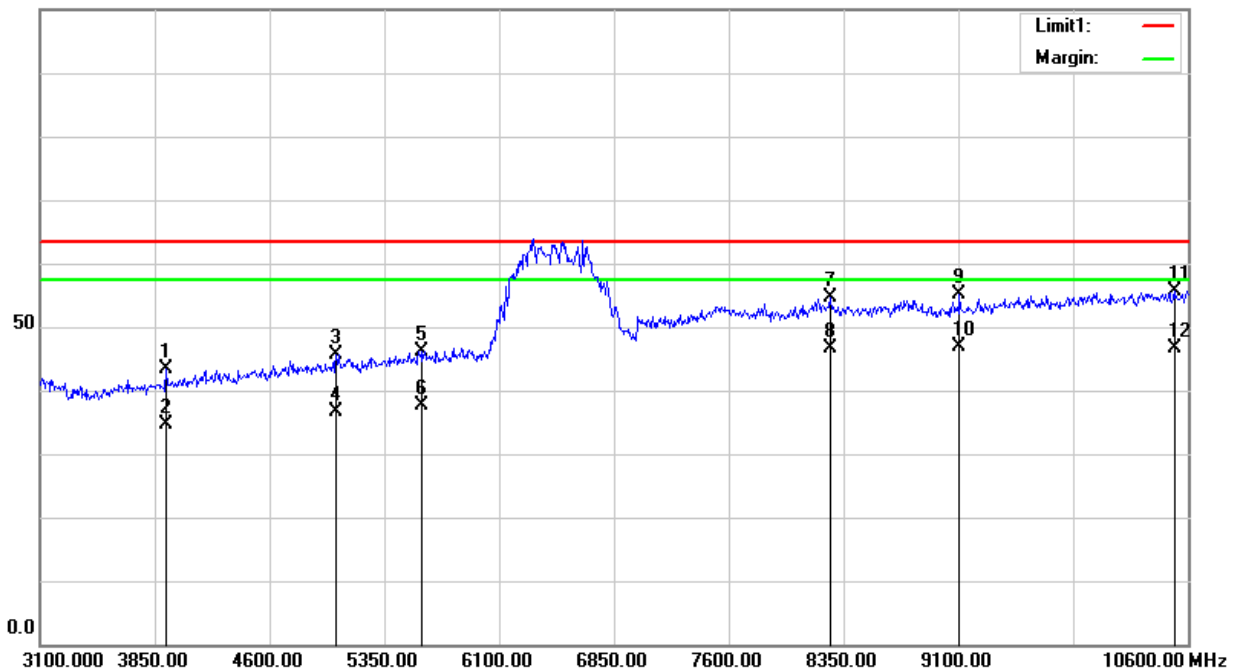
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1 (3100MHz – 10600MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	3925.000	53.41	-10.03	43.38	63.44	-20.06	peak
2	3925.000	44.55	-10.03	34.52	63.44	-28.92	RMS
3	5035.000	51.78	-6.03	45.75	63.44	-17.69	peak
4	5035.000	42.54	-6.03	36.51	63.44	-26.93	RMS
5	5590.000	50.98	-4.74	46.24	63.44	-17.20	peak
6	5590.000	42.25	-4.74	37.51	63.44	-25.93	RMS
7	8260.000	52.16	2.45	54.61	63.44	-8.83	peak
8	8260.000	44.09	2.45	46.54	63.44	-16.90	RMS
9	9107.500	52.40	2.61	55.01	63.44	-8.43	peak
10	9107.500	44.21	2.61	46.82	63.44	-16.62	RMS
11	10510.000	50.71	4.99	55.70	63.44	-7.74	peak
12	10510.000	41.72	4.99	46.71	63.44	-16.73	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

100.0 dBuV/m





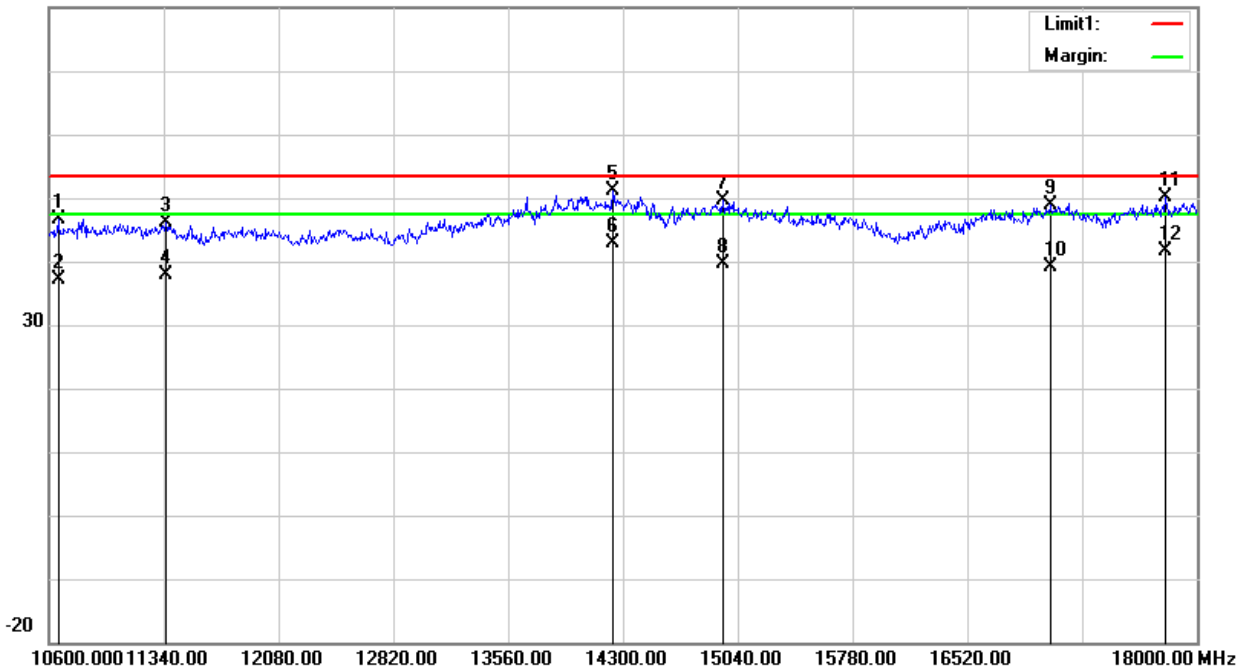
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1 (10600MHz – 18000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10659.200	41.26	5.39	46.65	53.44	-6.79	peak
2	10659.200	31.71	5.39	37.10	53.44	-16.34	RMS
3	11354.800	39.76	6.37	46.13	53.44	-7.31	peak
4	11354.800	31.48	6.37	37.85	53.44	-15.59	RMS
5	14233.400	39.33	11.90	51.23	53.44	-2.21	peak
6	14233.400	30.95	11.90	42.85	53.44	-10.59	RMS
7	14943.800	39.52	10.21	49.73	53.44	-3.71	peak
8	14943.800	29.38	10.21	39.59	53.44	-13.85	RMS
9	17052.800	38.36	10.54	48.90	53.44	-4.54	peak
10	17052.800	28.61	10.54	39.15	53.44	-14.29	RMS
11	17792.800	29.19	20.99	50.18	53.44	-3.26	peak
12	17792.800	20.53	20.99	41.52	53.44	-11.92	RMS

Remark:

- Margin = Result (Result = Reading + Factor) – Limit
- Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain

80.0 dBuV/m





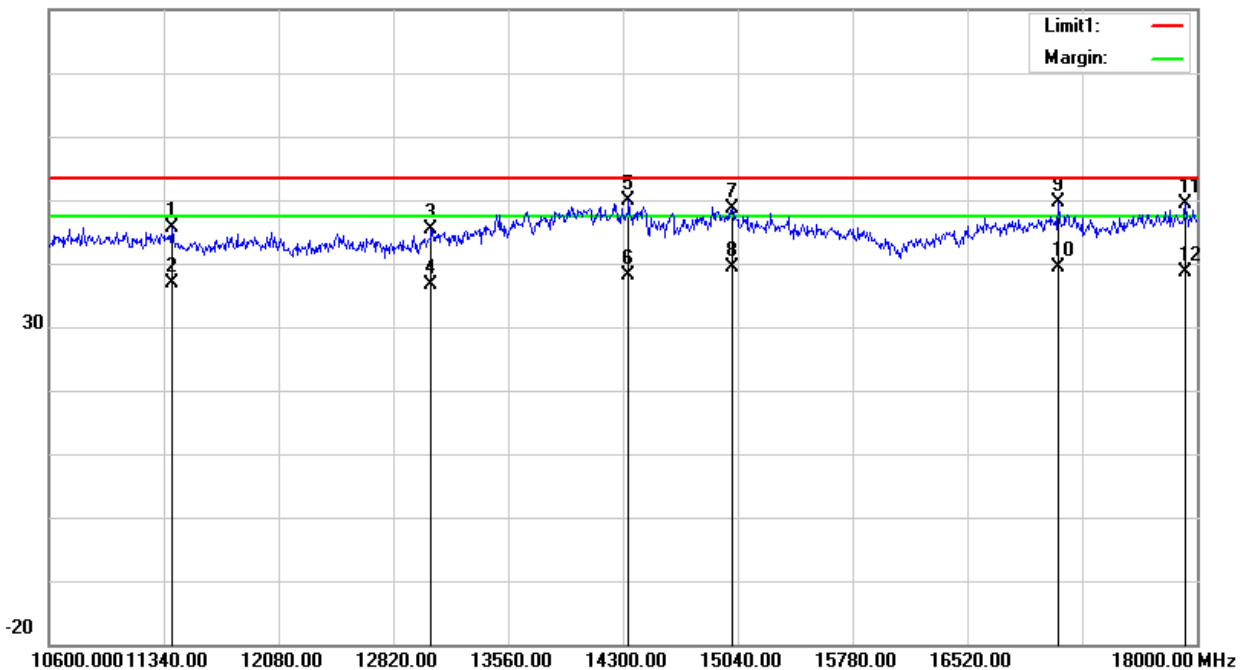
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1 (10600MHz – 18000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	11391.800	39.23	6.39	45.62	53.44	-7.82	peak
2	11391.800	30.55	6.39	36.94	53.44	-16.50	RMS
3	13064.200	38.39	6.96	45.35	53.44	-8.09	peak
4	13064.200	29.62	6.96	36.58	53.44	-16.86	RMS
5	14337.000	38.12	11.70	49.82	53.44	-3.62	peak
6	14337.000	26.54	11.70	38.24	53.44	-15.20	RMS
7	15003.000	38.61	10.06	48.67	53.44	-4.77	peak
8	15003.000	29.42	10.06	39.48	53.44	-13.96	RMS
9	17104.600	39.75	9.99	49.74	53.44	-3.70	peak
10	17104.600	29.42	9.99	39.41	53.44	-14.03	RMS
11	17926.000	37.55	11.85	49.40	53.44	-4.04	peak
12	17926.000	26.67	11.85	38.52	53.44	-14.92	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m



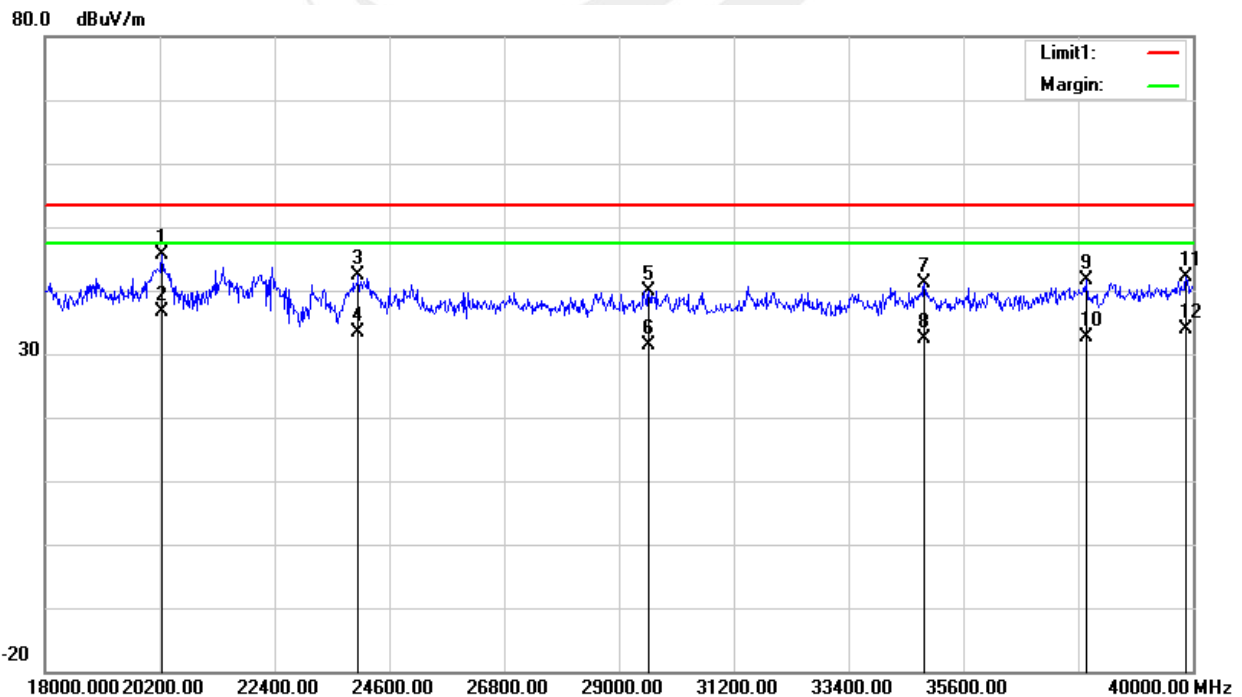


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1 (18000MHz – 40000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20244.000	20.91	24.67	45.58	53.44	-7.86	peak
2	20244.000	11.98	24.67	36.65	53.44	-16.79	RMS
3	24006.000	14.13	28.13	42.26	53.44	-11.18	peak
4	24006.000	5.35	28.13	33.48	53.44	-19.96	RMS
5	29572.000	40.00	0.00	40.00	53.44	-13.44	peak
6	29572.000	31.50	0.00	31.50	53.44	-21.94	RMS
7	34852.000	41.18	0.00	41.18	53.44	-12.26	peak
8	34852.000	32.48	0.00	32.48	53.44	-20.96	RMS
9	37954.000	41.61	0.00	41.61	53.44	-11.83	peak
10	37954.000	32.75	0.00	32.75	53.44	-20.69	RMS
11	39868.000	42.08	0.00	42.08	53.44	-11.36	peak
12	39868.000	33.80	0.00	33.80	53.44	-19.64	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain







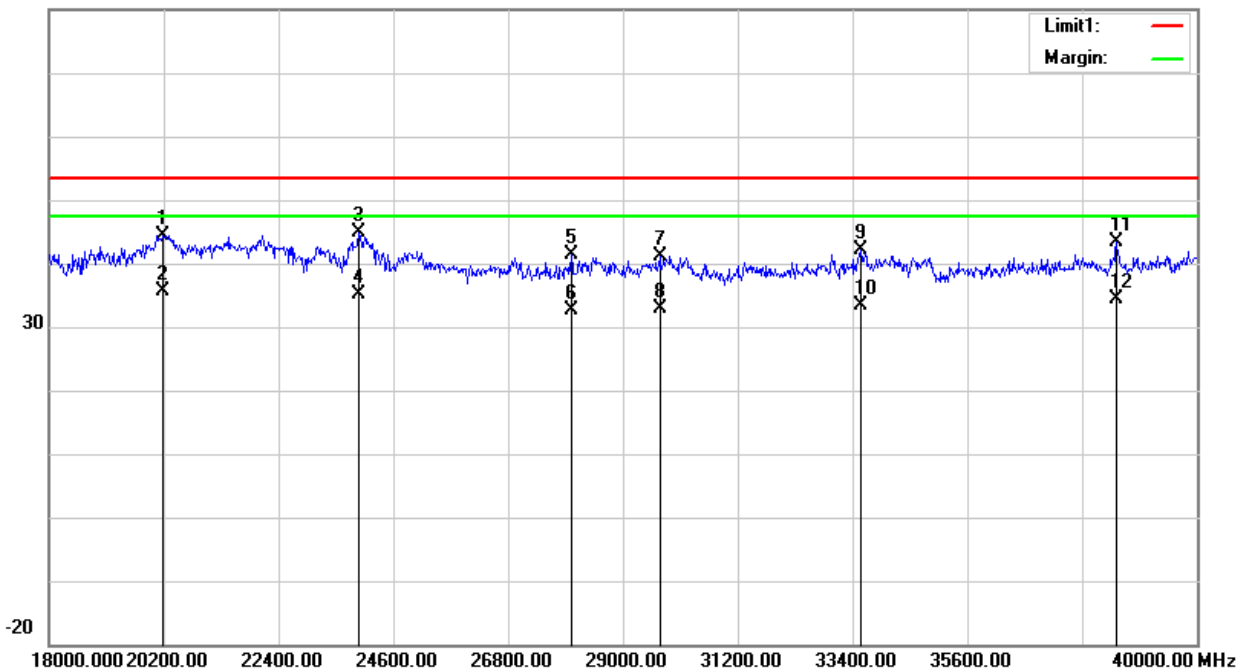
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1 (18000MHz – 40000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20178.000	31.13	13.28	44.41	53.44	-9.03	peak
2	20178.000	22.40	13.28	35.68	53.44	-17.76	RMS
3	23940.000	28.73	16.05	44.78	53.44	-8.66	peak
4	23940.000	19.13	16.05	35.18	53.44	-18.26	RMS
5	28010.000	41.50	0.00	41.50	53.44	-11.94	peak
6	28010.000	32.75	0.00	32.75	53.44	-20.69	RMS
7	29704.000	41.16	0.00	41.16	53.44	-12.28	peak
8	29704.000	32.82	0.00	32.82	53.44	-20.62	RMS
9	33554.000	42.14	0.00	42.14	53.44	-11.30	peak
10	33554.000	33.48	0.00	33.48	53.44	-19.96	RMS
11	38460.000	43.35	0.00	43.35	53.44	-10.09	peak
12	20178.000	31.13	13.28	44.41	53.44	-9.03	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





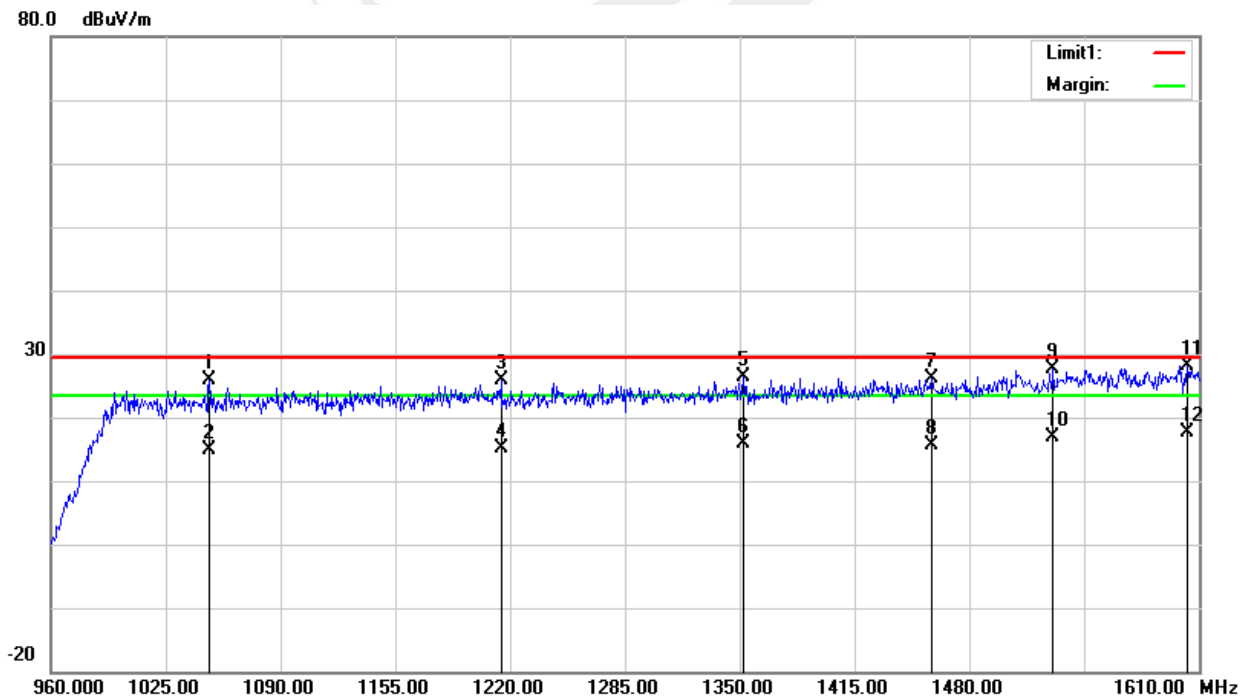
IC:

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(960MHz -1610MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1049.700	27.14	-1.37	25.77	29.44	-3.67	peak
2	1049.700	16.26	-1.37	14.89	29.44	-14.55	RMS
3	1214.800	26.44	-0.44	26.00	29.44	-3.44	peak
4	1214.800	15.69	-0.44	15.25	29.44	-14.19	RMS
5	1351.950	26.22	0.07	26.29	29.44	-3.15	peak
6	1351.950	15.88	0.07	15.95	29.44	-13.49	RMS
7	1458.550	25.08	0.99	26.07	29.44	-3.37	peak
8	1458.550	14.75	0.99	15.74	29.44	-13.70	RMS
9	1527.450	25.43	2.13	27.56	29.44	-1.88	peak
10	1527.450	14.72	2.13	16.85	29.44	-12.59	RMS
11	1603.500	24.00	4.24	28.24	29.44	-1.20	peak
12	1603.500	13.40	4.24	17.64	29.44	-11.80	RMS

Remark:

1. Margin = Result (Result =Reading + Factor )-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





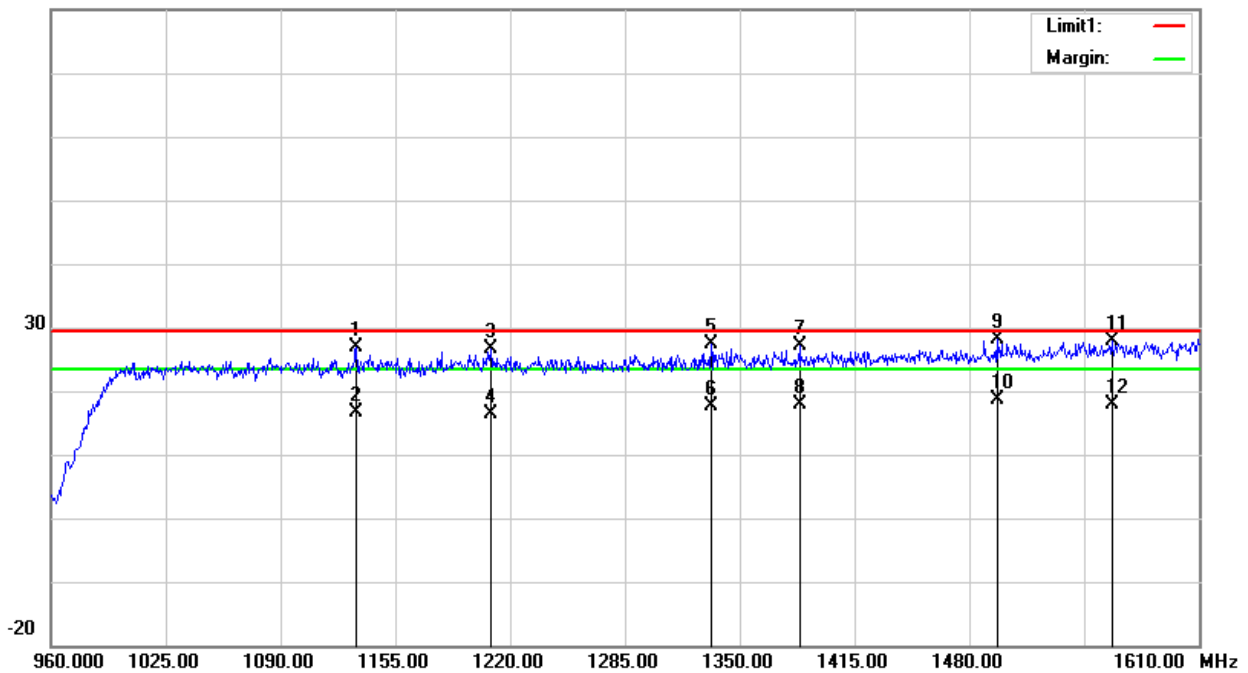
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(960MHz -1610MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1132.900	27.97	-0.97	27.00	29.44	-2.44	peak
2	1132.900	17.51	-0.97	16.54	29.44	-12.90	RMS
3	1208.950	27.12	-0.43	26.69	29.44	-2.75	peak
4	1208.950	16.71	-0.43	16.28	29.44	-13.16	RMS
5	1333.750	27.27	-0.01	27.26	29.44	-2.18	peak
6	1333.750	17.65	-0.01	17.64	29.44	-11.80	RMS
7	1383.800	26.82	0.20	27.02	29.44	-2.42	peak
8	1383.800	17.65	0.20	17.85	29.44	-11.59	RMS
9	1495.600	26.69	1.42	28.11	29.44	-1.33	peak
10	1495.600	17.18	1.42	18.60	29.44	-10.84	RMS
11	1560.600	24.99	3.00	27.99	29.44	-1.45	peak
12	1560.600	14.96	3.00	17.96	29.44	-11.48	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





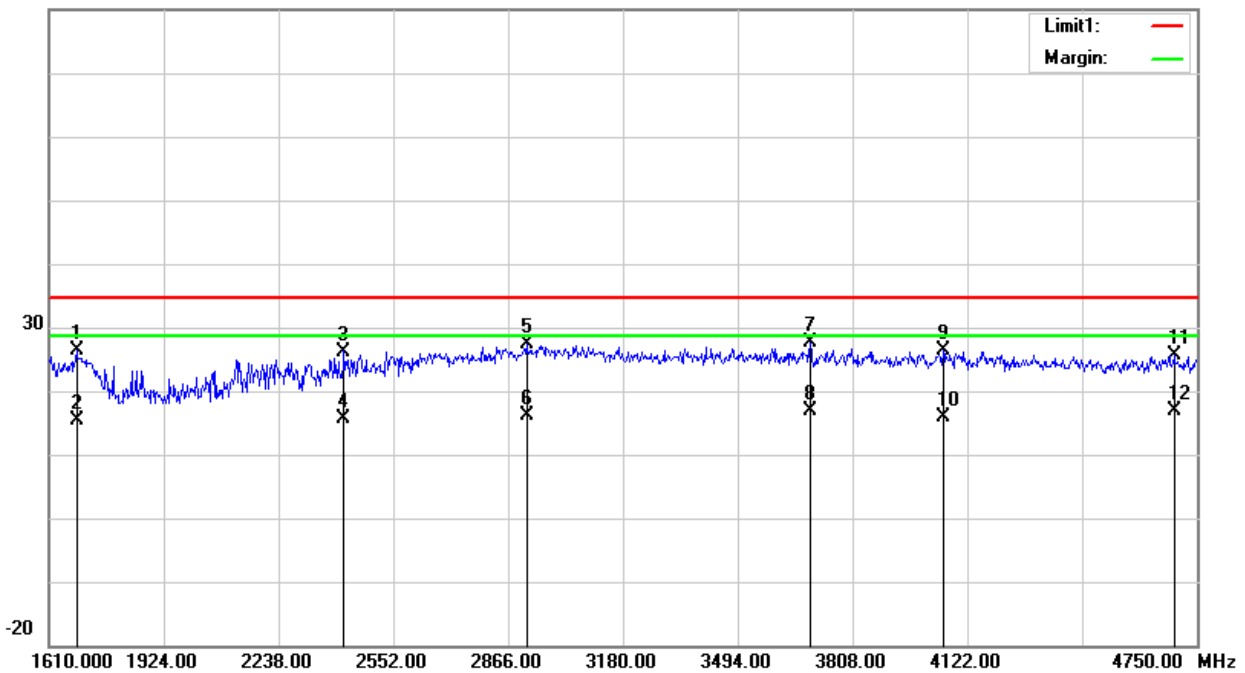
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(1610MHz – 4750MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1685.360	21.38	4.93	26.31	34.74	-8.43	peak
2	1685.360	10.48	4.93	15.41	34.74	-19.33	RMS
3	2416.980	21.75	4.50	26.25	34.74	-8.49	peak
4	2416.980	11.15	4.50	15.65	34.74	-19.09	RMS
5	2916.240	20.69	6.80	27.49	34.74	-7.25	peak
6	2916.240	9.35	6.80	16.15	34.74	-18.59	RMS
7	3691.820	-1.22	28.96	27.74	34.74	-7.00	peak
8	3691.820	-12.11	28.96	16.85	34.74	-17.89	RMS
9	4056.060	-3.38	29.80	26.42	34.74	-8.32	peak
10	4056.060	-13.86	29.80	15.94	34.74	-18.80	RMS
11	4687.200	-5.33	30.97	25.64	34.74	-9.10	peak
12	4687.200	-14.13	30.97	16.84	34.74	-17.90	RMS

Remark:

1. Margin = Result (Result =Reading + Factor )-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





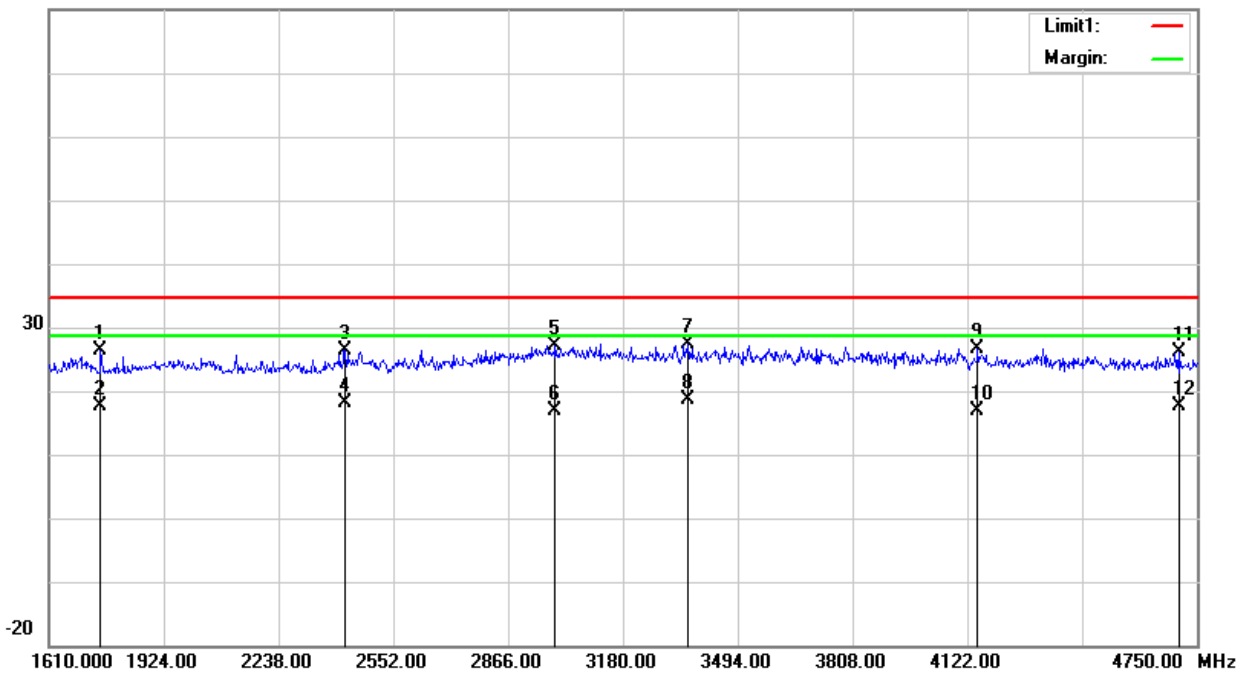
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(1610MHz – 4750MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1751.300	22.69	3.62	26.31	34.74	-8.43	peak
2	1751.300	13.92	3.62	17.54	34.74	-17.20	RMS
3	2420.120	21.86	4.50	26.36	34.74	-8.38	peak
4	2420.120	13.75	4.50	18.25	34.74	-16.49	RMS
5	2994.740	20.10	7.03	27.13	34.74	-7.61	peak
6	2994.740	9.86	7.03	16.89	34.74	-17.85	RMS
7	3358.980	-1.13	28.42	27.29	34.74	-7.45	peak
8	3358.980	-9.84	28.42	18.58	34.74	-16.16	RMS
9	4150.260	-3.30	29.97	26.67	34.74	-8.07	peak
10	4150.260	-13.13	29.97	16.84	34.74	-17.90	RMS
11	4699.760	-4.81	31.00	26.19	34.74	-8.55	peak
12	4699.760	-13.44	31.00	17.56	34.74	-17.18	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





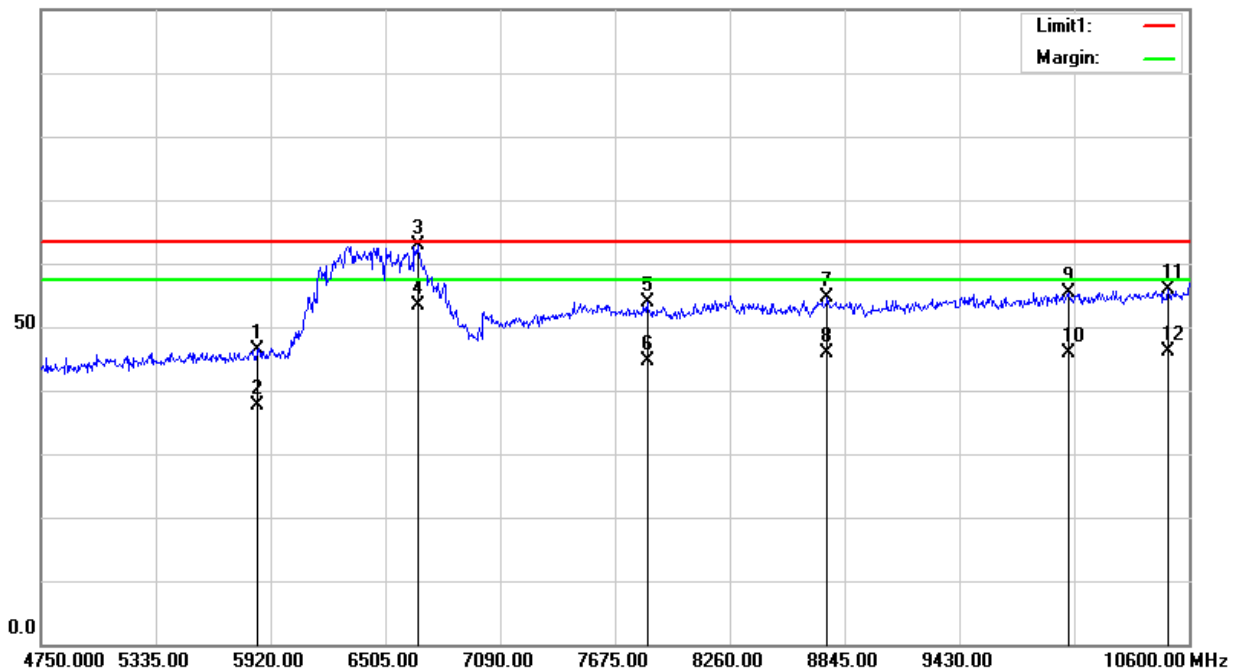
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1 (4750MHz – 10600MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5855.650	50.55	-4.07	46.48	63.44	-16.96	peak
2	5855.650	41.61	-4.07	37.54	63.44	-25.90	RMS
3	6668.800	64.13	-1.25	62.88	63.44	-0.56	peak
4	6668.800	54.73	-1.25	53.48	63.44	-9.96	RMS
5	7838.800	51.91	2.00	53.91	63.44	-9.53	peak
6	7838.800	42.54	2.00	44.54	63.44	-18.90	RMS
7	8757.250	51.97	2.58	54.55	63.44	-8.89	peak
8	8757.250	43.26	2.58	45.84	63.44	-17.60	RMS
9	9985.750	52.12	3.35	55.47	63.44	-7.97	peak
10	9985.750	42.49	3.35	45.84	63.44	-17.60	RMS
11	10494.700	50.86	4.95	55.81	63.44	-7.63	peak
12	10494.700	41.30	4.95	46.25	63.44	-17.19	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

100.0 dBuV/m



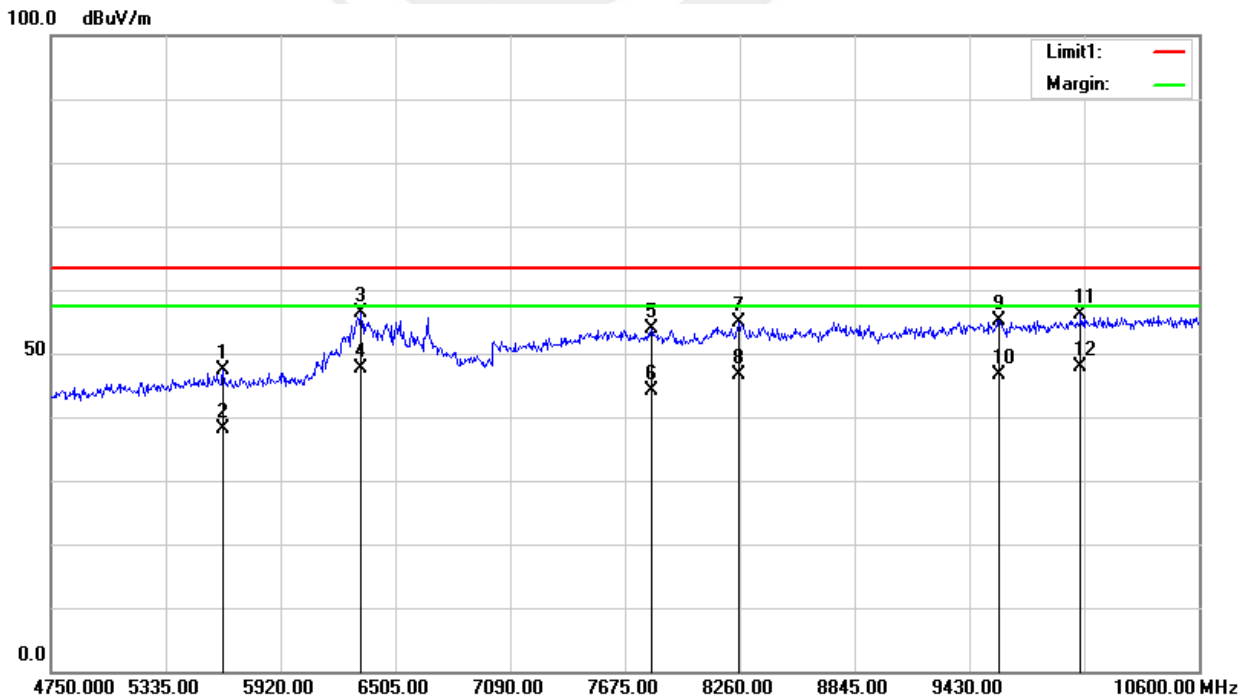


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1 (4750MHz – 10600MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5627.500	51.95	-4.69	47.26	63.44	-16.18	peak
2	5627.500	42.84	-4.69	38.15	63.44	-25.29	RMS
3	6329.500	58.71	-2.37	56.34	63.44	-7.10	peak
4	6329.500	49.95	-2.37	47.58	63.44	-15.86	RMS
5	7809.550	51.98	1.96	53.94	63.44	-9.50	peak
6	7809.550	42.29	1.96	44.25	63.44	-19.19	RMS
7	8254.150	52.38	2.45	54.83	63.44	-8.61	peak
8	8254.150	44.19	2.45	46.64	63.44	-16.80	RMS
9	9582.100	51.84	3.18	55.02	63.44	-8.42	peak
10	9582.100	43.54	3.18	46.72	63.44	-16.72	RMS
11	9997.450	52.67	3.36	56.03	63.44	-7.41	peak
12	9997.450	44.59	3.36	47.95	63.44	-15.49	RMS

Remark:

- Margin = Result (Result =Reading + Factor) –Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





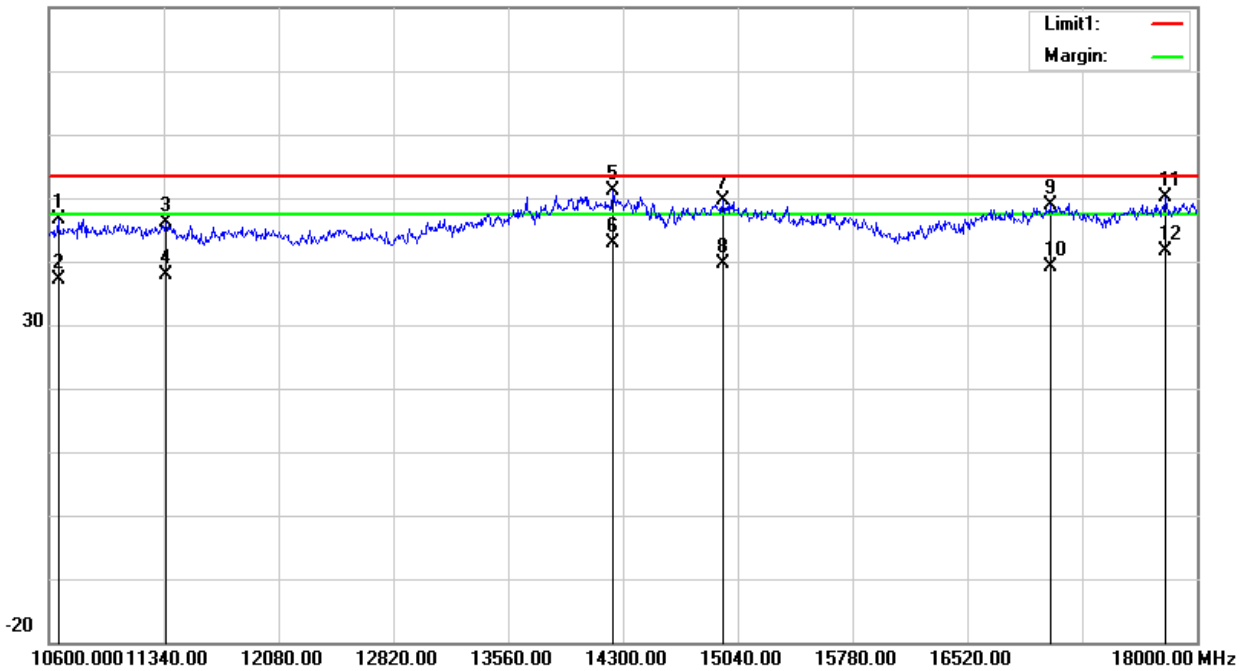
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1 (10600MHz – 18000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	10659.200	41.26	5.39	46.65	53.44	-6.79	peak
2	10659.200	31.71	5.39	37.10	53.44	-16.34	RMS
3	11354.800	39.76	6.37	46.13	53.44	-7.31	peak
4	11354.800	31.48	6.37	37.85	53.44	-15.59	RMS
5	14233.400	39.33	11.90	51.23	53.44	-2.21	peak
6	14233.400	30.95	11.90	42.85	53.44	-10.59	RMS
7	14943.800	39.52	10.21	49.73	53.44	-3.71	peak
8	14943.800	29.38	10.21	39.59	53.44	-13.85	RMS
9	17052.800	38.36	10.54	48.90	53.44	-4.54	peak
10	17052.800	28.61	10.54	39.15	53.44	-14.29	RMS
11	17792.800	29.19	20.99	50.18	53.44	-3.26	peak
12	17792.800	20.53	20.99	41.52	53.44	-11.92	RMS

Remark:

- Margin = Result (Result = Reading + Factor) – Limit
- Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain

80.0 dBuV/m







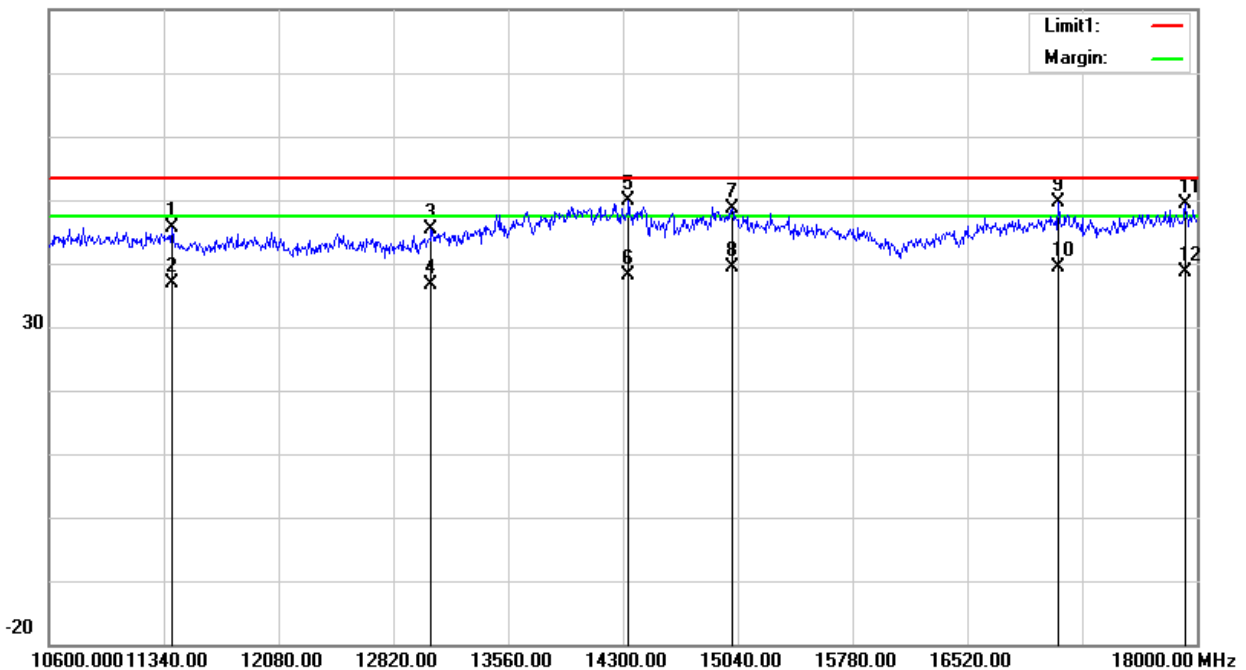
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1 (10600MHz – 18000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	11391.800	39.23	6.39	45.62	53.44	-7.82	peak
2	11391.800	30.55	6.39	36.94	53.44	-16.50	RMS
3	13064.200	38.39	6.96	45.35	53.44	-8.09	peak
4	13064.200	29.62	6.96	36.58	53.44	-16.86	RMS
5	14337.000	38.12	11.70	49.82	53.44	-3.62	peak
6	14337.000	26.54	11.70	38.24	53.44	-15.20	RMS
7	15003.000	38.61	10.06	48.67	53.44	-4.77	peak
8	15003.000	29.42	10.06	39.48	53.44	-13.96	RMS
9	17104.600	39.75	9.99	49.74	53.44	-3.70	peak
10	17104.600	29.42	9.99	39.41	53.44	-14.03	RMS
11	17926.000	37.55	11.85	49.40	53.44	-4.04	peak
12	17926.000	26.67	11.85	38.52	53.44	-14.92	RMS

Remark:

- Margin = Result (Result = Reading + Factor) – Limit
- Factor = Antenna factor + Cable attenuation factor (cable loss) – Amplifier gain

80.0 dBuV/m



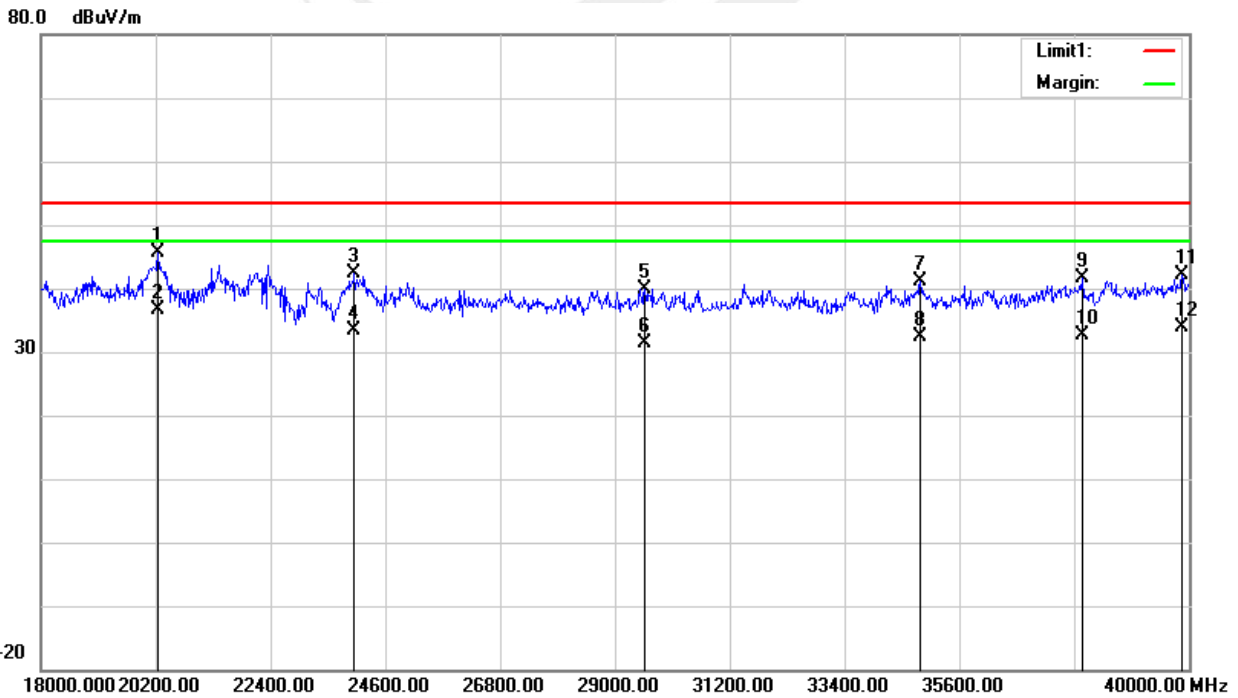


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1 (10600MHz – 40000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20244.000	20.91	24.67	45.58	53.44	-7.86	peak
2	20244.000	11.98	24.67	36.65	53.44	-16.79	RMS
3	24006.000	14.13	28.13	42.26	53.44	-11.18	peak
4	24006.000	5.35	28.13	33.48	53.44	-19.96	RMS
5	29572.000	40.00	0.00	40.00	53.44	-13.44	peak
6	29572.000	31.50	0.00	31.50	53.44	-21.94	RMS
7	34852.000	41.18	0.00	41.18	53.44	-12.26	peak
8	34852.000	32.48	0.00	32.48	53.44	-20.96	RMS
9	37954.000	41.61	0.00	41.61	53.44	-11.83	peak
10	37954.000	32.75	0.00	32.75	53.44	-20.69	RMS
11	39868.000	42.08	0.00	42.08	53.44	-11.36	peak
12	39868.000	33.80	0.00	33.80	53.44	-19.64	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





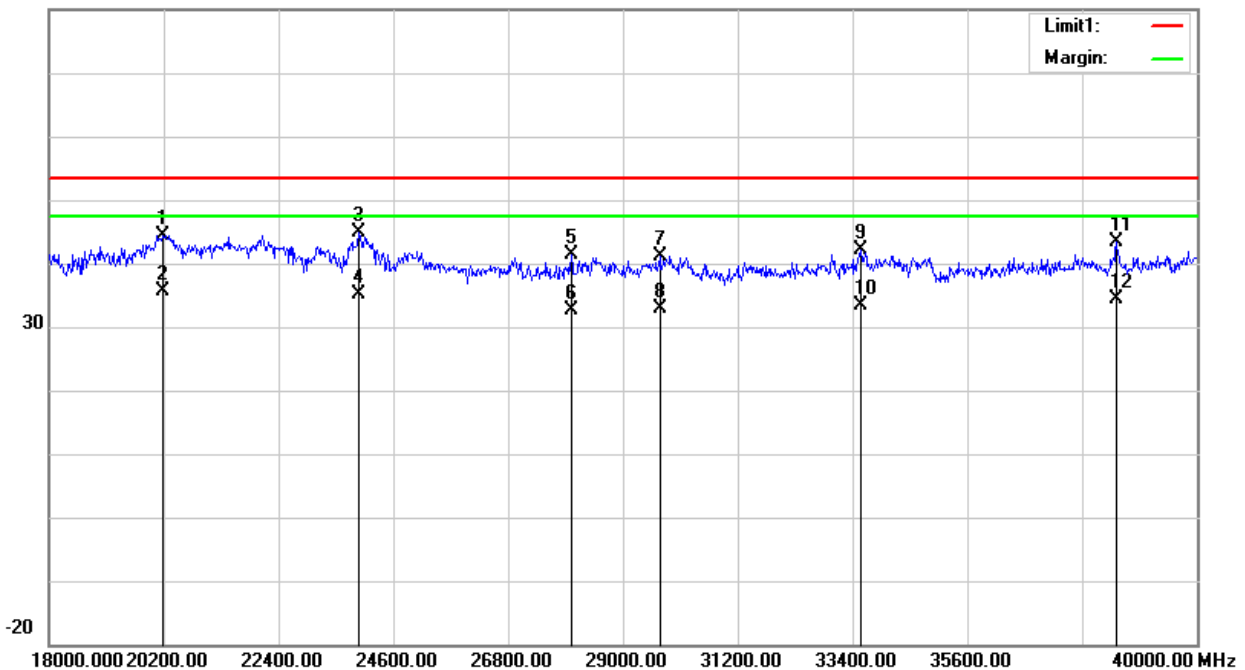
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1 (10600MHz – 40000MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20178.000	31.13	13.28	44.41	53.44	-9.03	peak
2	20178.000	22.40	13.28	35.68	53.44	-17.76	RMS
3	23940.000	28.73	16.05	44.78	53.44	-8.66	peak
4	23940.000	19.13	16.05	35.18	53.44	-18.26	RMS
5	28010.000	41.50	0.00	41.50	53.44	-11.94	peak
6	28010.000	32.75	0.00	32.75	53.44	-20.69	RMS
7	29704.000	41.16	0.00	41.16	53.44	-12.28	peak
8	29704.000	32.82	0.00	32.82	53.44	-20.62	RMS
9	33554.000	42.14	0.00	42.14	53.44	-11.30	peak
10	33554.000	33.48	0.00	33.48	53.44	-19.96	RMS
11	38460.000	43.35	0.00	43.35	53.44	-10.09	peak
12	38460.000	34.28	0.00	34.28	53.44	-19.16	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





## 3.3 RADIATED EMISSION MEASUREMENT (FOR 15.517(d)&amp;RSS 220 5.2.1(e))

## 3.3.1 RADIATED EMISSION LIMITS

Frequency of Emission (MHz)	EIRP (dBm)	Field Strength (dBuV/m@3m)	Field Strength (dBuV/m@1m)
1164~1240	-85.3	10	19.54
1559~1610	-85.3	10	19.54

Notes: 1. Transfer rules follow 15.521(g),15.31(f)(1).

2. 15.521(g) converted to a peak field strength level at 3 meters using  $E(\text{dBuV/m}) = P(\text{dBmEIRP}) + 95.2$ .

3.  $\text{dBuV/m@1m} = \text{dBuV/m@3m} + 20 \cdot \log(3/1)$

UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency Range	RBW	VBW	Detector	Measurement Distance
1164~1240	1kHz	3kHz	RMS	1 Meter
1559~1610	1kHz	3kHz	RMS	1 Meter

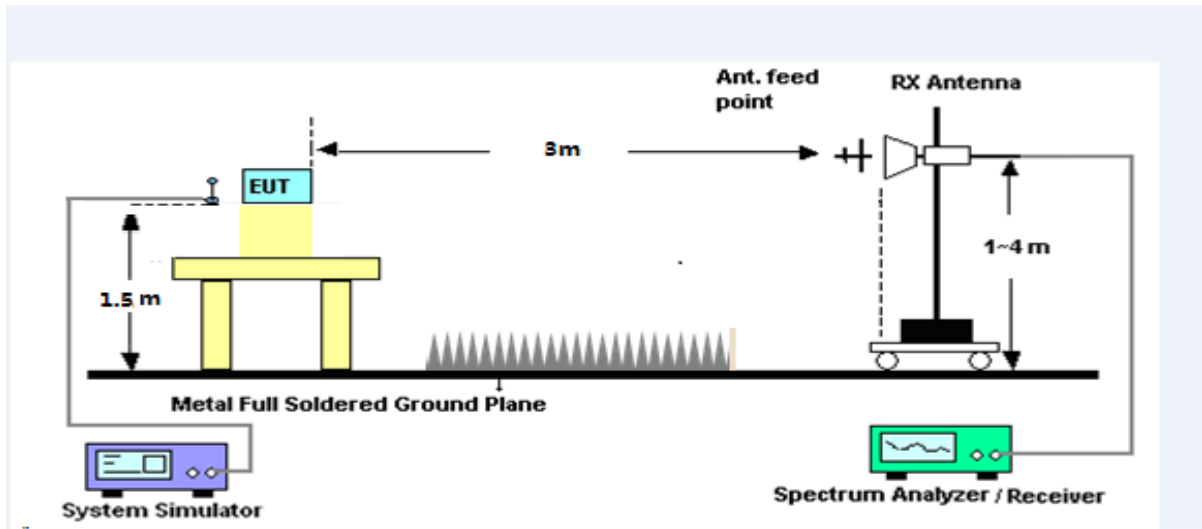
## 3.3.2 TEST PROCEDURE

- a. The measuring distance of 1m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- c. All readings are RMS mode value, for each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.  
(Above 960MHz)
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.  
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

## 3.3.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.3.4 TEST SETUP

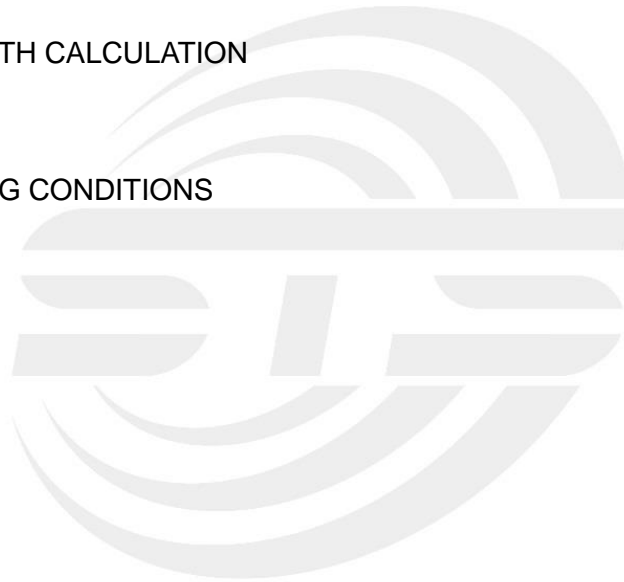


### 3.3.5 FIELD STRENGTH CALCULATION

Same as 3.2.5

### 3.3.6 EUT OPERATING CONDITIONS

Same as 3.2.6





3.3.7 TEST RESULTS

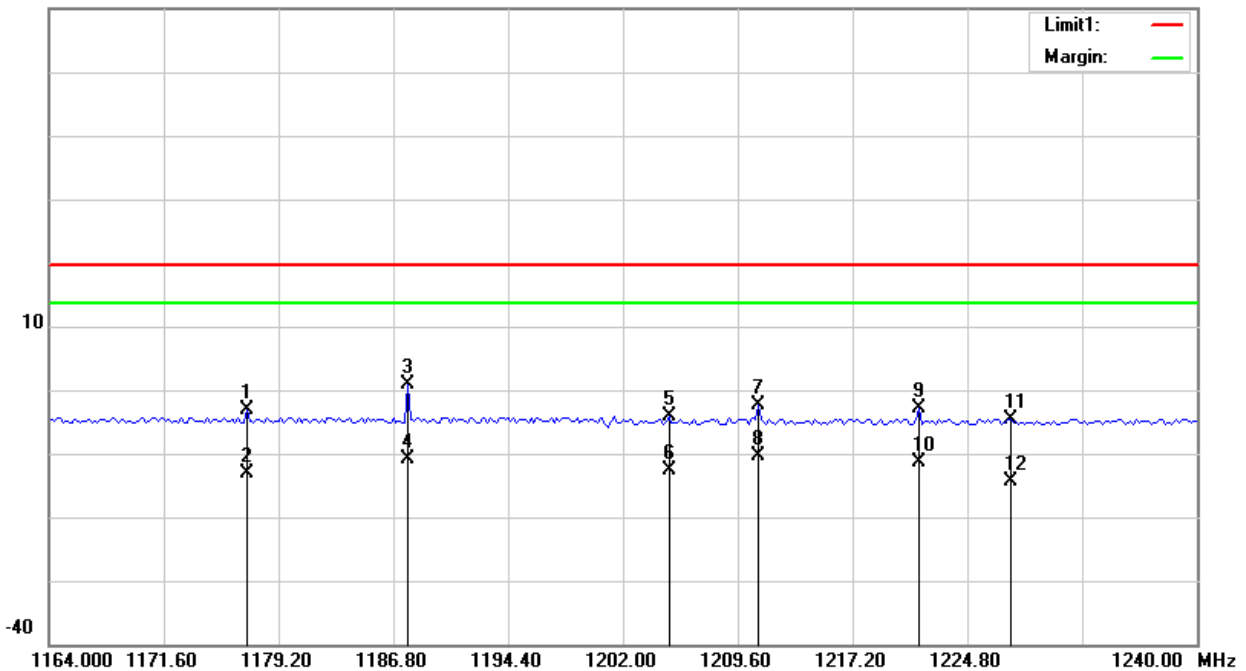
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(1164Hz – 1240MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1177.110	-2.49	-0.65	-3.14	19.54	-22.68	peak
2	1177.110	-12.59	-0.65	-13.24	19.54	-32.78	RMS
3	1187.750	1.35	-0.54	0.81	19.54	-18.73	peak
4	1187.750	-10.31	-0.54	-10.85	19.54	-30.39	RMS
5	1205.040	-3.57	-0.43	-4.00	19.54	-23.54	peak
6	1205.040	-12.10	-0.43	-12.53	19.54	-32.07	RMS
7	1210.930	-1.95	-0.44	-2.39	19.54	-21.93	peak
8	1210.930	-9.99	-0.44	-10.43	19.54	-29.97	RMS
9	1221.570	-2.37	-0.46	-2.83	19.54	-22.37	peak
10	1221.570	-10.80	-0.46	-11.26	19.54	-30.80	RMS
11	1227.650	-4.05	-0.47	-4.52	19.54	-24.06	peak
12	1227.650	-13.81	-0.47	-14.28	19.54	-33.82	RMS

Remark:

1. Margin = Result (Result =Reading + Factor) –Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

60.0 dBuV/m





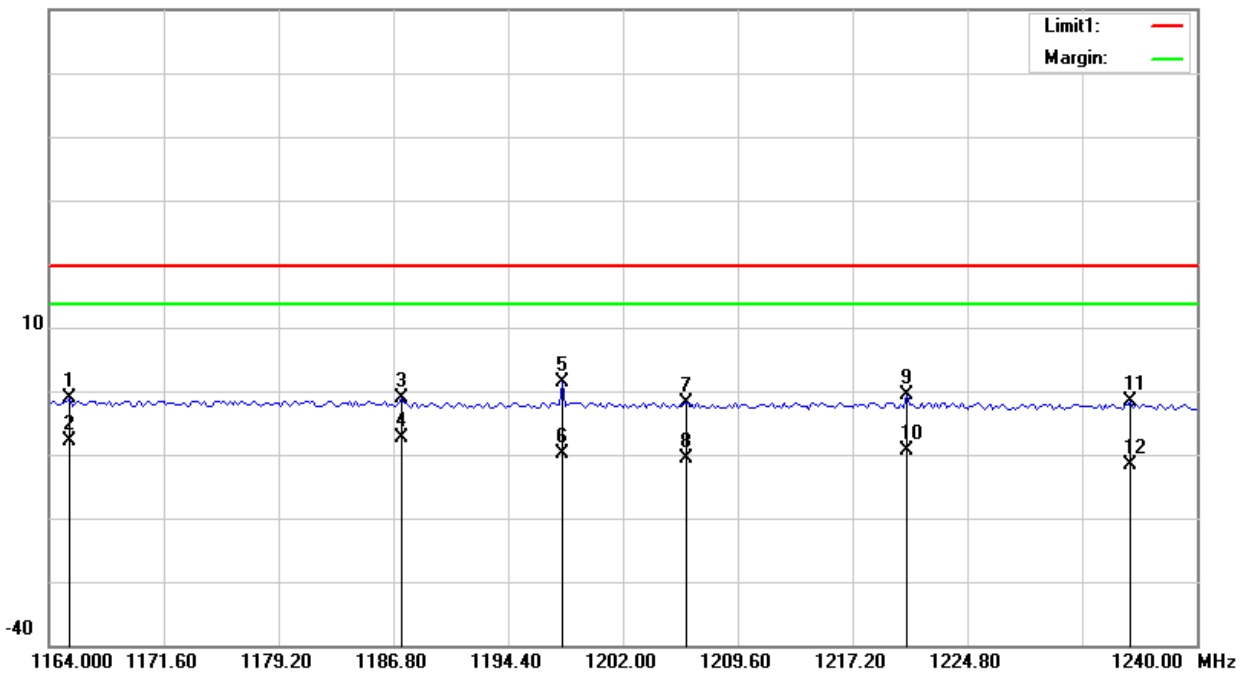
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(1164Hz – 1240MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1165.330	-0.40	-0.76	-1.16	19.54	-20.70	peak
2	1165.330	-7.09	-0.76	-7.85	19.54	-27.39	RMS
3	1187.370	-0.49	-0.54	-1.03	19.54	-20.57	peak
4	1187.370	-6.77	-0.54	-7.31	19.54	-26.85	RMS
5	1198.010	1.78	-0.44	1.34	19.54	-18.20	peak
6	1198.010	-9.31	-0.44	-9.75	19.54	-29.29	RMS
7	1206.180	-1.33	-0.43	-1.76	19.54	-21.30	peak
8	1206.180	-10.08	-0.43	-10.51	19.54	-30.05	RMS
9	1220.810	-0.26	-0.45	-0.71	19.54	-20.25	peak
10	1220.810	-8.97	-0.45	-9.42	19.54	-28.96	RMS
11	1235.630	-1.08	-0.49	-1.57	19.54	-21.11	peak
12	1235.630	-11.09	-0.49	-11.58	19.54	-31.12	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

60.0 dBuV/m





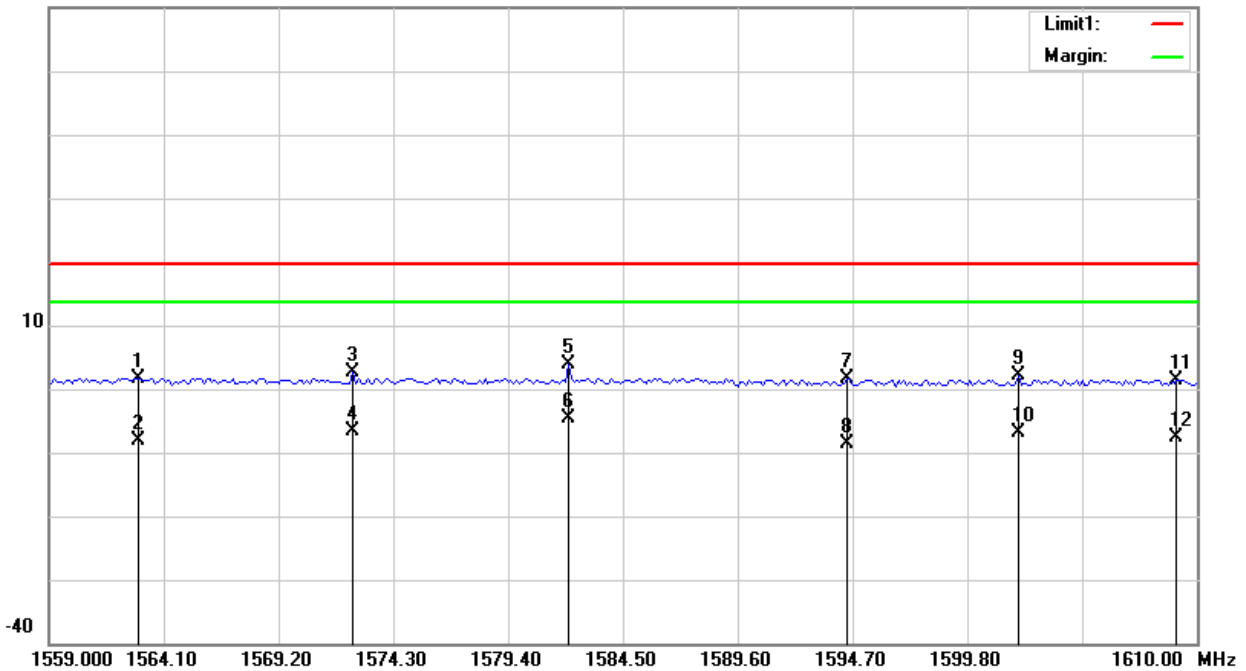
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1(1559Hz – 1610MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1562.953	-1.33	3.08	1.75	19.54	-17.79	peak
2	1562.953	-11.25	3.08	-8.17	19.54	-27.71	RMS
3	1572.515	-0.75	3.38	2.63	19.54	-16.91	peak
4	1572.515	-9.90	3.38	-6.52	19.54	-26.06	RMS
5	1582.078	0.20	3.68	3.88	19.54	-15.66	peak
6	1582.078	-8.36	3.68	-4.68	19.54	-24.22	RMS
7	1594.445	-2.36	4.07	1.71	19.54	-17.83	peak
8	1594.445	-12.80	4.07	-8.73	19.54	-28.27	RMS
9	1602.095	-2.09	4.24	2.15	19.54	-17.39	peak
10	1602.095	-11.06	4.24	-6.82	19.54	-26.36	RMS
11	1609.108	-2.75	4.23	1.48	19.54	-18.06	peak
12	1609.108	-11.75	4.23	-7.52	19.54	-27.06	RMS

Remark:

1. Margin = Result (Result =Reading + Factor )-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

60.0 dBuV/m







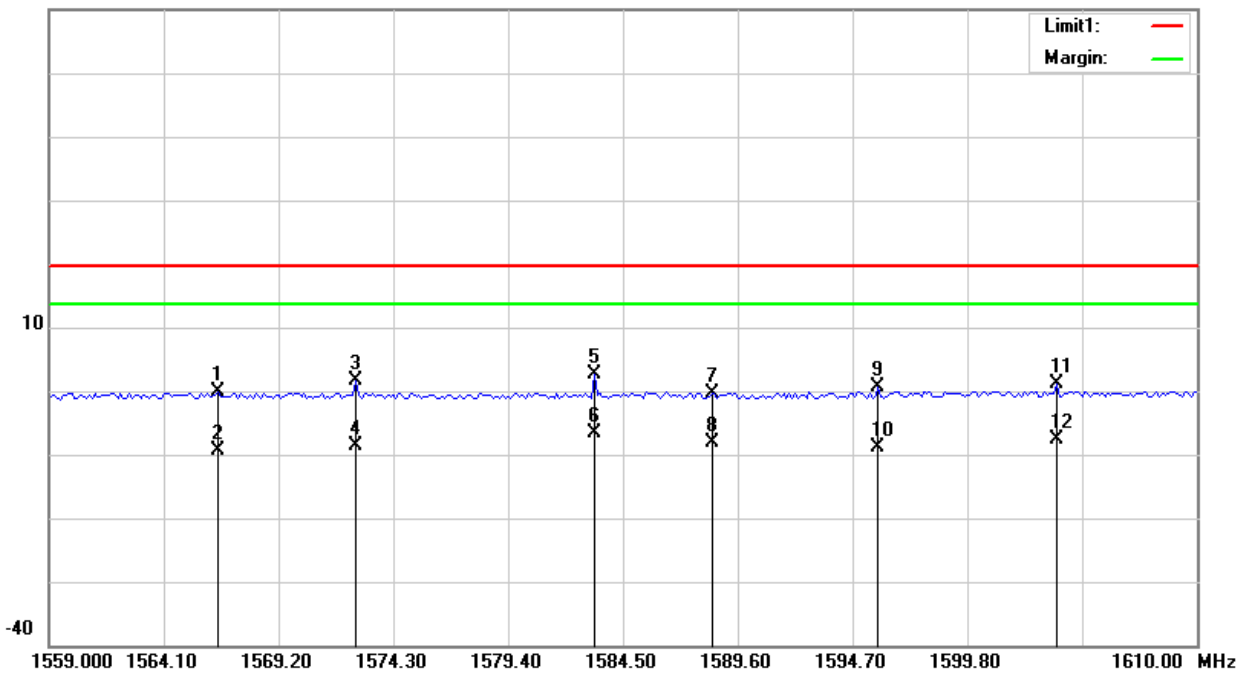
Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1(1559Hz – 1610MHz)	Test distance:	1m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1566.523	-3.25	3.19	-0.06	19.54	-19.60	peak
2	1566.523	-12.55	3.19	-9.36	19.54	-28.90	RMS
3	1572.642	-1.75	3.38	1.63	19.54	-17.91	peak
4	1572.642	-12.01	3.38	-8.63	19.54	-28.17	RMS
5	1583.225	-1.03	3.72	2.69	19.54	-16.85	peak
6	1583.225	-10.29	3.72	-6.57	19.54	-26.11	RMS
7	1588.453	-4.18	3.88	-0.30	19.54	-19.84	peak
8	1588.453	-12.02	3.88	-8.14	19.54	-27.68	RMS
9	1595.848	-3.54	4.11	0.57	19.54	-18.97	peak
10	1595.848	-12.86	4.11	-8.75	19.54	-28.29	RMS
11	1603.753	-3.18	4.24	1.06	19.54	-18.48	peak
12	1603.753	-11.88	4.24	-7.64	19.54	-27.18	RMS

Remark:

- Margin = Result (Result =Reading + Factor )-Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

60.0 dBuV/m



#### 4. UWB BANDWIDTH AND 99% BANDWIDTH

##### 4.1 LIMITS OF UWB BANDWIDTH MEASUREMENT

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

At any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

The 99% bandwidth for reporting purposes only.

##### 4.2 INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE

Frequency Range	RBW	VBW	Detector	Measurement Distance
3100~10600	1MHz	1MHz	PEAK	1 Meter

##### 4.3 TEST PROCEDURE

- a. The measuring distance of 1m shall be used for measurements. The EUT was placed on the top of arotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization of the antenna are set to make the measurement.
- c. All readings are RMS mode value , for each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading .
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- e. The Spectrum Analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. The UWB Bandwidth is measured at the 10 dB point (FL, FH).

Note: Both horizontal and vertical antenna polarities were tested. The worst case emissions were reported.

99% Bandwidth connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the occupied bandwidth
VBW	approximately 3×RBW
Trace	Max hold
Sweep	Auto

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

##### 4.4 TEST SETUP

Same as 3.3.4

##### 4.5 EUT OPERATION CONDITIONS

Same as 3.2.6

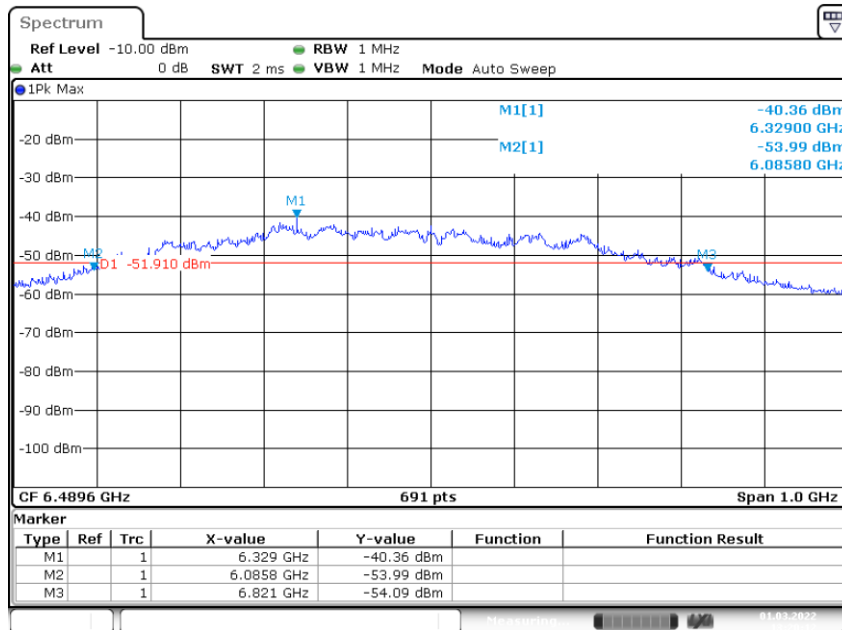


4.6 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	50%
Test Voltage:	DC 12V		

Test Channel	f <sub>M</sub> (MHz)	f <sub>L</sub> (MHz)	f <sub>H</sub> (MHz)	-10dB Bandwidth (MHz)	f <sub>c</sub> (MHz)	Fractional Bandwidth (MHz)	Limit	Result
CH1	6329	6085.8	6821	735.2	6453.4	0.11	-10dB Bandwidth ≥ 500MHz or Fractional Bandwidth ≥ 0.2	Pass

CH 1



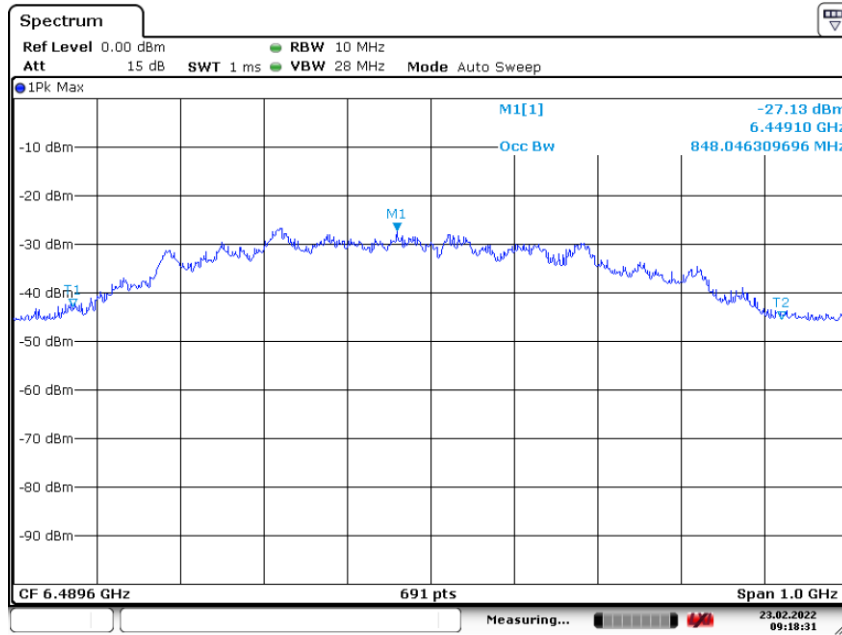
Date: 1.MAR.2022 13:20:12



Temperature:	25 °C	Relative Humidity:	50%
Test Voltage:	DC 12V		

Frequency (MHz)	99% Bandwidth (MHz)	Result
6489.6	848.05	PASS

### CH 1



Date: 23.FEB.2022 09:18:31



## 5 PEAK EMISSION WITHIN A 50MHZ BANDWIDTH (FOR 15.517(e) & RSS-220

### 5.2.1(g))

#### 5.1 LIMITS OF PEAK EMISSION

The Maximum Peak Output Power Measurement is 0dBm(RBW=50MHz).

If a resolution bandwidth other than 50 MHz is Employed, the peak EIRP limit shall be  $20 \log(RBW/50)$  dBm where RBW is the resolution bandwidth in megahertz that is employed. The resolution bandwidth used to make the peak measurement was 1MHz, resulting in a limit of -34dBm.

This may be converted to a peak field strength level at 3 meters using

$$E(\text{dBuV/m}) = P(\text{dBm EIRP}) + 95.2 = -34 + 95.2 = 61.2 \text{ dBuV/m}$$

$$\text{Note: } EIRP_{1\text{MHz}} = EIRP_{50\text{MHz}} + 20\log(1\text{MHz} / 50 \text{ MHz}) = 0 \text{ dBm} + -34 \text{ dB} = -34 \text{ dBm}$$

#### 5.2 INSTRUMENT SETUP VALUE AND MEASUREMENT DISTANCE

Frequency Range	RBW	VBW	Detector	Measurement Distance
3100~10600	1MHz	3MHz	PEAK	3 Meter

#### 5.3 TEST PROCEDURE

Same as 3.3.2

#### 5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 5.5 TEST SETUP

Same as 3.3.4

#### 5.6 FIELD STRENGTH CALCULATION

Same as 3.2.5

#### 5.7 EUT OPERATING CONDITIONS

Same as 3.2.5



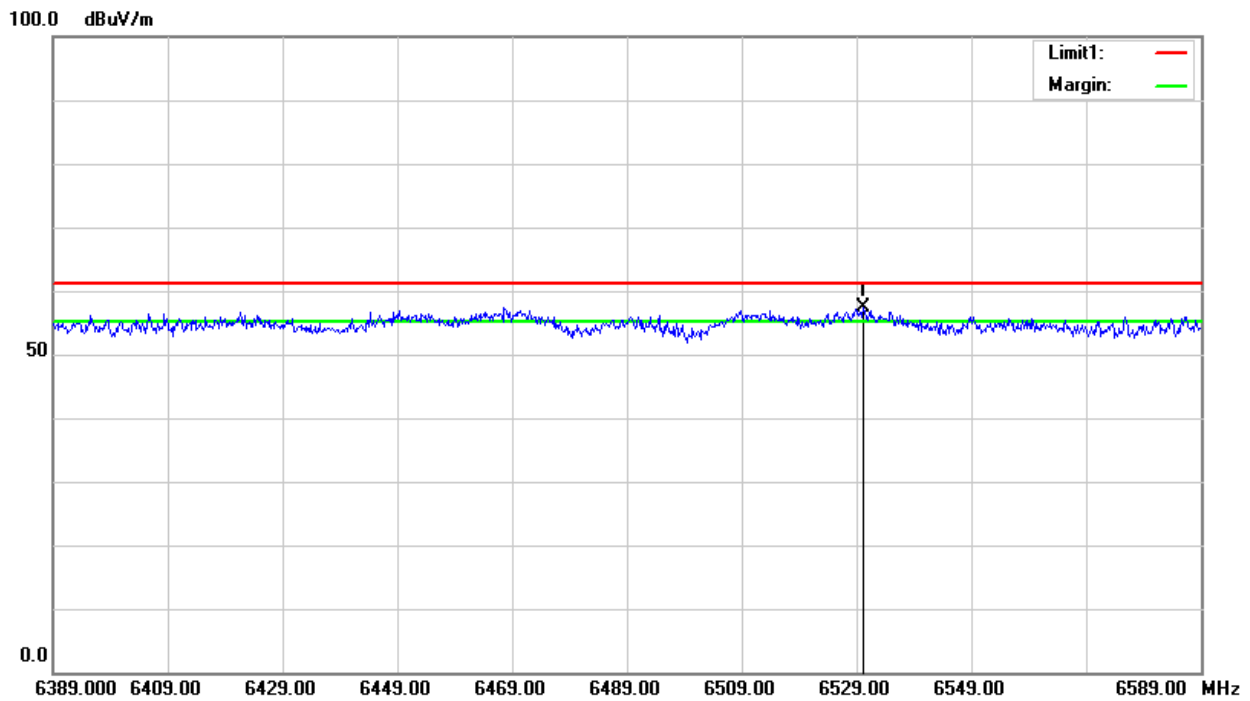
### 5.8 TEST RESULTS

Temperature:	23.5(C)	Relative Humidity:	62%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	CH 1	Test distance:	3m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6530.200	59.37	-1.89	57.48	61.20	-3.72	peak

Remark:

- 1. Margin = Result (Result =Reading + Factor )-Limit
- 2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





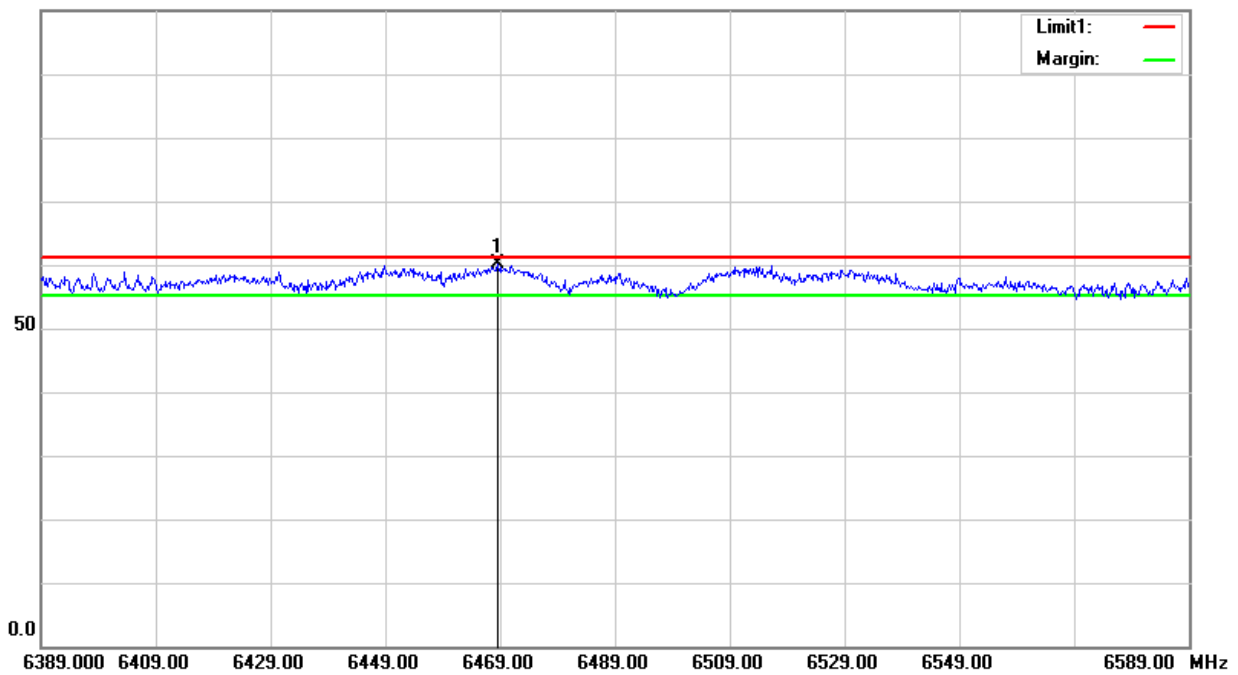
Temperature:	23.5(C)	Relative Humidity:	62%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	CH 1	Test distance:	3m

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6468.600	62.08	-2.03	60.05	61.20	-1.15	peak

Remark:

- 1. Margin = Result (Result =Reading + Factor )-Limit
- 2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

100.0 dBuV/m





## 6. ANTENNA REQUIREMENT

### 6.1 STANDARD REQUIREMENT

According to the FCC Part 15 Paragraph 15.203&RSS-Gen(6.8), 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.

### 6.2 EUT ANTENNA

The EUT antenna is Ceramic Antenna.It conforms to the standard requirements.







## APPENDIX- PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

\*\*\*\*\*END OF THE REPORT\*\*\*\*\*

