

TEST REPORT

of

ARIB STD-T93

Equipment Under Test : FOB Smart Key
Model Name : FOB-4F83M33J
Variant Model Name(s) : -
Applicant : Hyundai Mobis Co., Ltd.
Manufacturer : Hyundai Mobis Co., Ltd.
Date of Receipt : 2025.02.25
Date of Test(s) : 2025.02.28 ~ 2025.03.05
Date of Issue : 2025.04.22

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
 - 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
 - 3) This test report cannot be reproduced, except in full, without prior written permission of the Company.
 - 4) The data marked ※ in this report was provided by the customer and may affect the validity of the test results.
- We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by:



Jangwon Lee

Technical
Manager:



Haegyung Park

SGS Korea Co., Ltd. Gunpo Laboratory



Table of Contents

1. General Information -----	3
2. Frequency Tolerance & Occupied Bandwidth -----	6
3. Spurious Emission Intensity -----	9
4. Antenna Power and Tolerances for Antenna Power -----	29
5. Transmission Time Restriction -----	36

1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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1.2. Details of Applicant

Applicant : Hyundai Mobis Co., Ltd.

Address : 203, Teheran-ro, Gangnam-gu, Seoul, Republic of Korea

1.3. Details of Manufacturer

Company : Same as applicant

Address : Same as applicant

1.4. Description of EUT

Kind of Product	FOB Smart Key
Model Name	FOB-4F83M33J
Power Supply	DC 3.0 V
Frequency Range	Tx : 315 MHz, Rx : 125 kHz
Modulation Technique	FSK
Number of Channels	1 channel
Antenna Type	PCB Pattern Antenna
Antenna Gain ※	-25.95 dB i

1.5. Test Equipment List

Date of Test	2025.02.28~2025.03.05					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Authority	Cal. Method
Spectrum Analyzer	R&S	FSV30	101004	Dec. 18, 2024	SICT	c)
Signal Generator	R&S	SMA100B	106887	Oct. 11, 2024	SICT	c)
EMI Test Receiver	R&S	ESW44	101767	Oct. 24, 2024	SICT	c)
DC Power Supply	R&S	HMP2020	019258024	Oct. 31, 2024	SICT	c)
DIGITAL MULTIMETER	HIOKI	DT4211	N0301231	Sep. 19, 2024	SICT	c)
Biconical Antenna	R&S	HK116	100261	Nov. 12, 2024	SICT	c)
Trilog BroadBand Antenna	SCHWARZBECK MESS-ELEKTR ONIK	VULB 9163	9163-653	May 14, 2024	SICT	c)
Horn Antenna	R&S	HF907	102270	Mar. 08, 2024	SICT	c)
Horn Antenna	R&S	HF907	102271	Mar. 08, 2024	SICT	c)

Note;

- a):** Calibration conducted by the National Institute of Information and Communications Technology or a designated calibration agency under Article 102-18 paragraph (1).
- b):** Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992).
- c):** Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
- d):** Calibration conducted by using other equipment that listed above from a) to c).

1.6. Test Method

Measurement was conducted by the following test method:

The test method of Ordinance Concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment in Annex 1, the Ministry of Internal Affairs and Communication notification in Annex 22-1 of Article 88, Paragraph 1 or the test method more than equivalent.

1.7. Summary of Test Results

The EUT has been tested according to the following specifications:

Applied Standard : Radio equipment regulations and ARIB STD-T93		
Article Reference	Test Item	Result
STD-T93 3.2	Frequency Tolerance & Occupied Bandwidth	Complied
STD-T93 3.2	Spurious Emission Intensity	Complied
STD-T93 3.2	Antenna Power and Tolerances for Antenna Power	Complied
STD-T93 3.4	Transmission Time Restriction	Complied
STD-T93 3.3	Secondary Radiated Emission	N/A

Note;

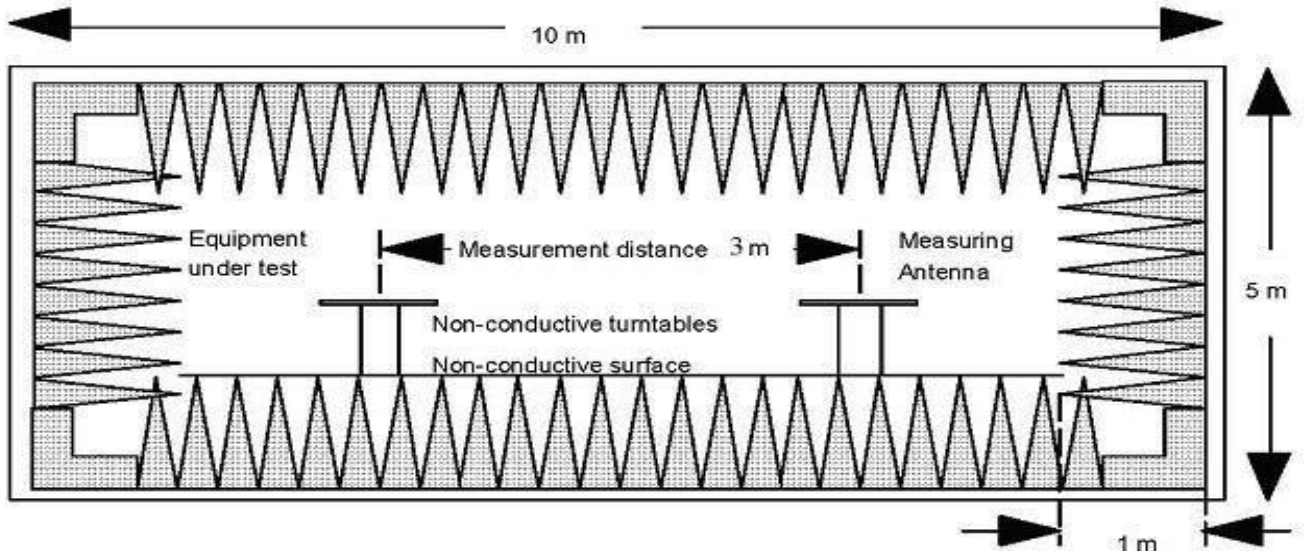
a): RX frequency is 125kHz and Secondary Radiated Emission test was not performed.

1.8. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL005904	2025.04.07	Initial
1	F690501-RF-RTL005904-1	2025.04.22	Add unit of spurious & Delete Secondary Radiated Emission test results

2. Frequency Tolerance & Occupied Bandwidth

2.1. Test Setup



2.2. Limit

Frequency Tolerance : designated frequency band 313.625 MHz (312 MHz to 315.25 MHz)

Occupied Bandwidth : 1 MHz or less

2.3. Test Procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. Set spectrum Analyzer as below:

Center frequency	: Test frequency
Span	: 2 to 3.5 times allowable Occupied Bandwidth (OBW)
RBW	: Approximately less than 3% of allowable OBW
VBW	: Same as RBW
Input level	: Carrier level should be sufficiently greater than residual noise level
Sweep time	: Minimum time required to make an accurate measurement For burst (intermittent) carrier measurement, one burst carrier signal should be included per sample interval
Sweep Data Points	: 400 or greater
Sweep mode	: Continuous (observe until trace waveform is stable)
Detector mode	: Positive peak
Indication mode	: Max hold

3. Record in the test report.

2.4. Test Result

Ambient temperature : $(23 \pm 1) ^\circ\text{C}$
Relative humidity : 47 % R.H.

2.4.1. Frequency Tolerance

Test Voltage (V)	Test Frequency (MHz)	Center Frequency (MHz)	Lower Frequency (MHz)	Upper Frequency (MHz)	Limit	Pass/Fail
V _{Low} = 2.70	315	315.000 000	314.943 060	315.056 940	Designated frequency band 313.625 MHz (312 MHz to 315.25 MHz)	Pass
V _{Normal} = 3.00	315	315.000 000	314.943 060	315.056 940		
V _{High} = 3.30	315	315.000 000	314.943 060	315.056 940		

Remark;

- Center Frequency (MHz) = {Upper Frequency (MHz) + Lower Frequency (MHz)} / 2
- Instrument used for testing includes spatial loss as an offset.

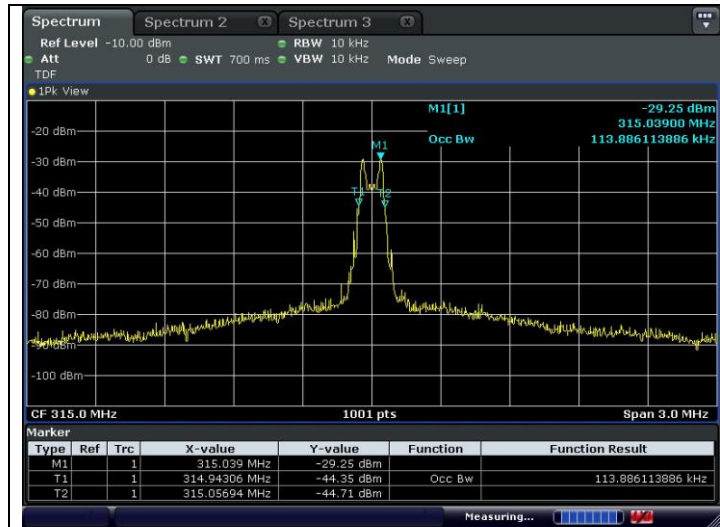
2.4.2. Occupied Bandwidth

Test Voltage (V)	Test Frequency (MHz)	Occupied Bandwidth (kHz)	Limit
V _{Low} = 2.70	315	113.886	1 MHz or less
V _{Normal} = 3.00	315	113.886	
V _{High} = 3.30	315	113.886	

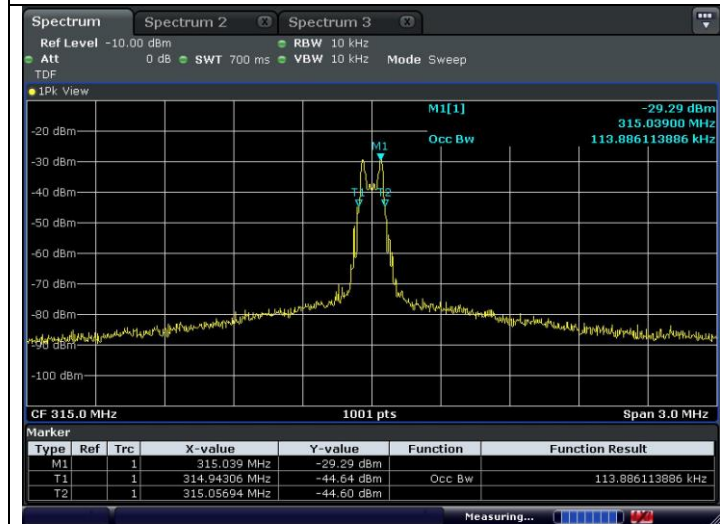
Remark;

- Instrument used for testing includes spatial loss as an offset.

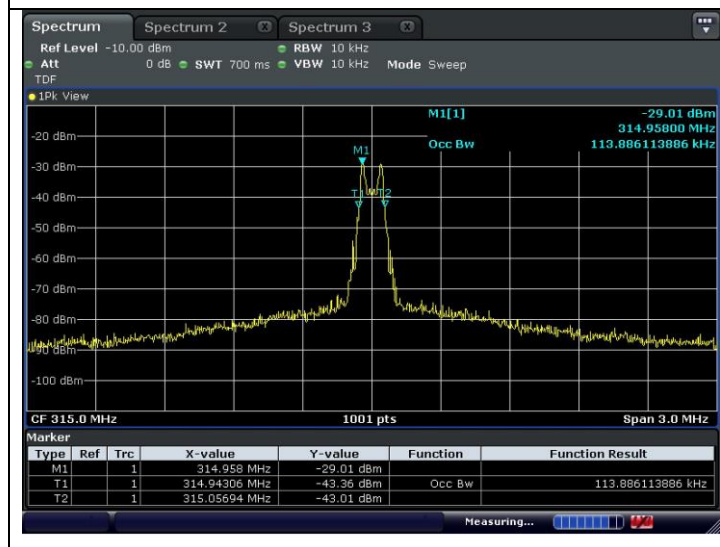
Low Voltage



Normal Voltage

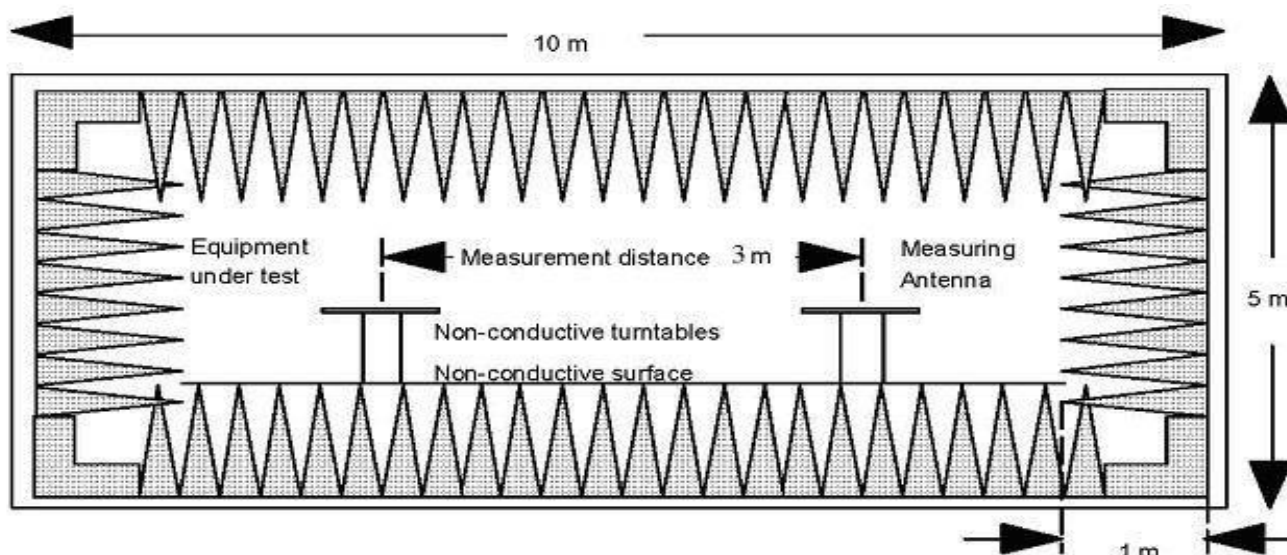


High Voltage



3. Spurious Emission Intensity

3.1. Test Setup



3.2. Limit

Frequency Band	Spurious Emission Intensity	Reference Bandwidth
Below 1 GHz	250 nW (E.I.R.P.) or less	100 kHz
Over 1 GHz	1 μ W (E.I.R.P.) or less	1 MHz

3.3. Test Procedure

1. Spectrum Analyzer

Searching for spurious emissions except near the carrier frequency.

Frequency range	: (See Note 1)
RBW	: Below 1 GHz: 100 kHz Above 1 GHz: 1 MHz
VBW	: Same as RBW
Input level	: Level that maximizes dynamic range
Sweep time	: Minimum time required to make an accurate measurement (see Note 2, 3)
Sweep Data Points	: 400 or greater
Sweep mode	: Single
Detector mode	: Positive peak

Note 1: Frequency range is 30 MHz to 3 GHz, excluding the 311 MHz to 316.25 MHz band.

Note 2: To reduce the sweep time for burst signals, sweep time may set to greater than the value below:

$$\frac{\text{Frequency Range (MHz)}}{\text{RBW (MHz)}} \times \text{Burst interval (sec)}$$

However, note that the measured signal level may be up to 3 dB less than the actual spurious emission level.

Note 3: To reduce the measurement time for a burst carrier with a long interval time (low duty cycle) the following spectrum analyzer setting may be used:

Sweep time : Less than the duration of the burst signal (transmit on time)
 Sweep mode : Continuous
 Display mode : Max hold

If an external trigger signal can be supplied to the spectrum analyzer, then perform a sweep synchronized to the carrier burst.

2. Spectrum Analyzer

Searching for spurious emissions near the carrier frequency.

Frequency range : 311 MHz to 311.998 5 MHz and 315.251 5 MHz to 316.25 MHz
 RBW : 3 kHz
 VBW : Same as RBW
 Sweep time : Minimum time required to make an accurate measurement
 Input level : Level that maximizes dynamic range
 Sweep Data Points : 400 or greater
 Sweep mode : Single
 Detector mode : Positive peak

3.4. Test Result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

3.4.1. Spurious Emission near the Carrier Frequency

Test Voltage (V)	Frequency Range (MHz)	Frequency (MHz)	RBW of Measurement	Polarity	Reading Values (dBm)	Level (dB m)	Level (μW)	Limit (dB m)	Margin (dB)
V _{Low} = 2.70	311 ~ 311.998 5	311.585	3 kHz	H	-99.27	-81.92	0.000 006 427	-36.02	45.90
	311 ~ 311.998 5	311.856	3 kHz	V	-102.62	-85.27	0.000 002 972	-36.02	49.25
	315.251 5 ~ 316.25	315.279	3 kHz	H	-86.86	-69.51	0.000 111 892	-36.02	33.49
	315.251 5 ~ 316.25	315.723	3 kHz	V	-102.19	-84.84	0.000 003 279	-36.02	48.82
V _{Normal} = 3.00	311 ~ 311.998 5	311.735	3 kHz	H	-100.68	-83.33	0.000 004 647	-36.02	47.31
	311 ~ 311.998 5	311.117	3 kHz	V	-101.96	-84.61	0.000 003 459	-36.02	48.59
	315.251 5 ~ 316.25	315.356	3 kHz	H	-87.40	-70.05	0.000 098 878	-36.02	34.03
	315.251 5 ~ 316.25	315.531	3 kHz	V	-101.63	-84.28	0.000 003 730	-36.02	48.26
V _{High} = 3.30	311 ~ 311.998 5	311.794	3 kHz	H	-100.65	-83.30	0.000 004 683	-36.02	47.28
	311 ~ 311.998 5	311.348	3 kHz	V	-102.73	-85.38	0.000 002 896	-36.02	49.36
	315.251 5 ~ 316.25	315.455	3 kHz	H	-88.74	-71.39	0.000 072 644	-36.02	35.37
	315.251 5 ~ 316.25	315.501	3 kHz	V	-101.18	-83.83	0.000 004 144	-36.02	47.81

Remark;

- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 + 15.2 (Conversion Factor) (dB)
- Conversion Factor of RBW = 10 x Log (Reference Bandwidth / RBW of measurement) = 15.2 [dB]
Where: Reference Bandwidth = 100 kHz
RBW of measurement = 3 kHz
- Reading values are E.R.P.
- Instrument used for testing includes spatial loss as an offset.

3.4.2. Spurious Emission except near the Carrier Frequency

Test Voltage (V)	Frequency Range (MHz)	Frequency (MHz)	RBW of Measurement	Polarity	Reading Values (dB m)	Level (dB m)	Level (μW)	Limit (dB m)	Margin (dB)
V _{Low} = 2.70	30 ~ 311	47.141	100 kHz	H	-80.30	-78.15	0.000 015 314	-36.02	42.13
		34.496	100 kHz	V	-76.47	-74.32	0.000 036 983	-36.02	38.30
V _{Normal} = 3.00	30 ~ 311	47.422	100 kHz	H	-79.15	-77.00	0.000 019 939	-36.02	40.98
		34.215	100 kHz	V	-74.91	-72.76	0.000 052 966	-36.02	36.74
V _{High} = 3.30	30 ~ 311	47.422	100 kHz	H	-78.97	-76.82	0.000 020 787	-36.02	40.80
		40.116	100 kHz	V	-75.09	-72.94	0.000 050 769	-36.02	36.92

Remark;

- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 (dB)
- Reading values are E.R.P.
- Instrument used for testing includes spatial loss as an offset.

Test Voltage (V)	Frequency Range (MHz)	Frequency (MHz)	RBW of Measurement	Polarity	Reading Values (dB m)	Level (dB m)	Level (μW)	Limit (dB m)	Margin (dB)
V _{Low} = 2.70	316.25 ~ 1000	630.091	100 kHz	H	-57.27	-55.12	0.003 076 097	-36.02	19.10
		878.976	100 kHz	H	-73.73	-71.58	0.000 069 438	-36.02	35.56
		630.091	100 kHz	V	-72.80	-70.65	0.000 086 139	-36.02	34.63
		881.711	100 kHz	V	-73.13	-70.98	0.000 079 726	-36.02	34.96
V _{Normal} = 3.00	316.25 ~ 1000	630.091	100 kHz	H	-57.01	-54.86	0.003 266 630	-36.02	18.84
		879.660	100 kHz	H	-74.28	-72.13	0.000 061 263	-36.02	36.11
		630.091	100 kHz	V	-74.42	-72.27	0.000 059 252	-36.02	36.25
		878.976	100 kHz	V	-73.68	-71.53	0.000 070 388	-36.02	35.51
V _{High} = 3.30	316.25 ~ 1000	630.091	100 kHz	H	-57.19	-55.04	0.003 130 401	-36.02	19.02
		879.660	100 kHz	H	-74.50	-72.35	0.000 058 264	-36.02	36.33
		630.091	100 kHz	V	-72.04	-69.89	0.000 102 542	-36.02	33.87
		879.660	100 kHz	V	-71.31	-69.16	0.000 121 395	-36.02	33.14

Remark;

- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 (dB)
- Reading values are E.R.P.
- Instrument used for testing includes spatial loss as an offset.

Test Voltage (V)	Frequency Range (MHz)	Frequency (MHz)	RBW of Measurement	Polarity	Reading Values (dB m)	Level (dB m)	Level (μW)	Limit (dB m)	Margin (dB)
V _{Low} = 2.70	1 000 ~ 3 000	2 703.20	1 MHz	H	-55.31	-53.16	0.004 836 153	-30	23.16
		2 973.60	1 MHz	V	-55.86	-53.71	0.004 256 964	-30	23.71
V _{Normal} = 3.00	1 000 ~ 3 000	2 001.20	1 MHz	H	-57.05	-54.90	0.003 233 702	-30	24.90
		2 700.80	1 MHz	V	-56.48	-54.33	0.003 687 228	-30	24.33
V _{High} = 3.30	1 000 ~ 3 000	2 474.20	1 MHz	H	-56.61	-54.46	0.003 582 614	-30	24.46
		2 713.40	1 MHz	V	-56.12	-53.97	0.004 006 822	-30	23.97

Remark;

- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 (dB)
- Reading values are E.R.P.
- Instrument used for testing includes spatial loss as an offset.

Low Voltage

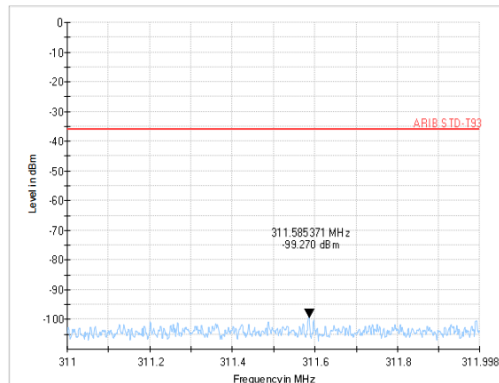
- 311 MHz ~ 311.998 5 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

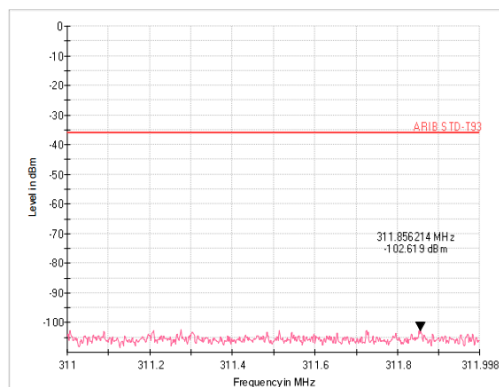


Vertical

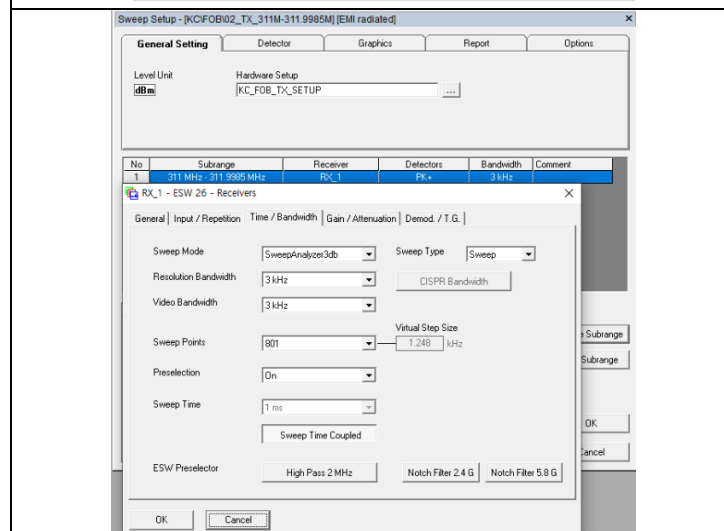
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



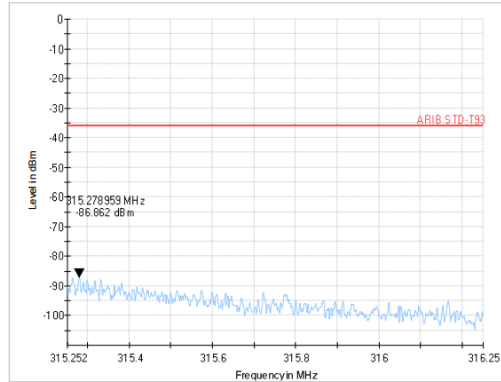
- 315.251 5 MHz ~ 316.25 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

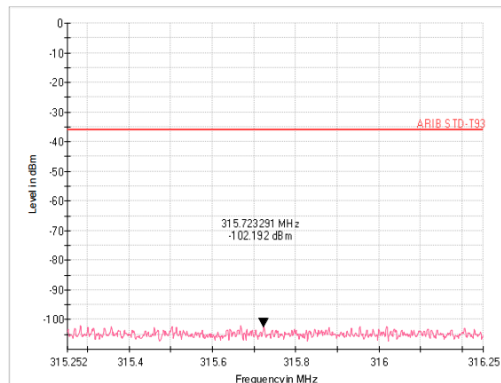


Vertical

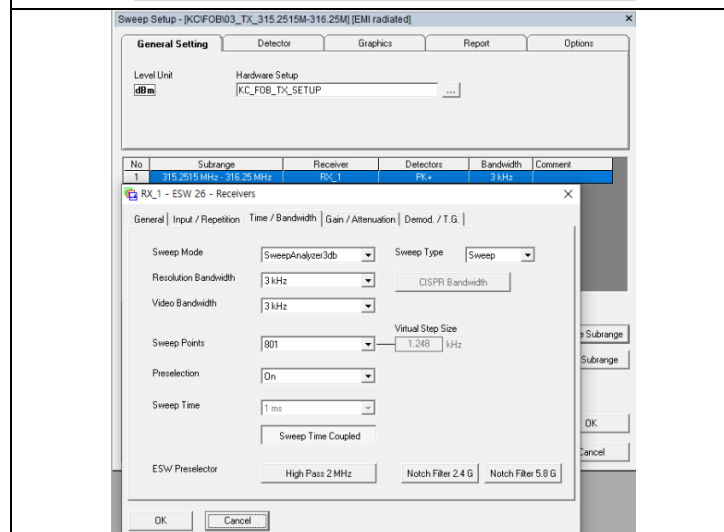
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



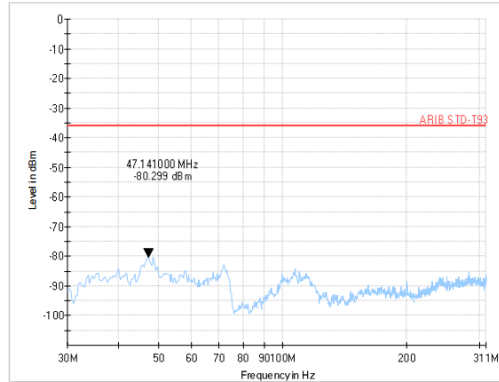
- 30 MHz ~ 311 MHz

Horizontal

EMC32 Report

Common Information

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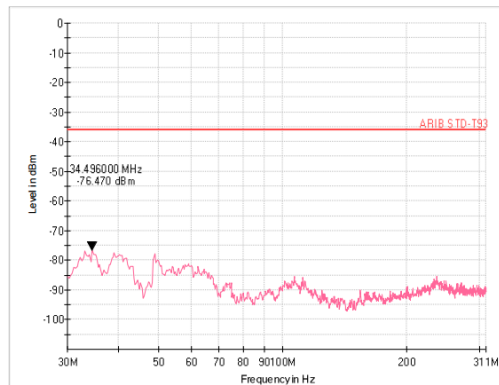


Vertical

EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value

Sweep Setup - [KCFOB01_TX_30M-311M] [EMI radiated]

General Setting | Detector | Graphics | Report | Options

Level Unit: dBm

Hardware Setup: KC_FOB_TX_SETUP

No.	Subrange	Receiver	Detectors	Bandwidth	Comment
1	30 MHz ~ 311 MHz	RX_1	Pk-P	100 kHz	

RX_1 - ESW 26 - Receivers

General | Input / Repetition | Time / Bandwidth | Gain / Attenuation | Demod / T.G.

Sweep Mode: Sweep/Analyze3db | Sweep Type: Sweep

Resolution Bandwidth: 100 kHz | CISPR Bandwidth

Video Bandwidth: 100 kHz

Sweep Points: 1001 | Virtual Step Size: 281.000 kHz

Preselection: On

Sweep Time: 1 ms

Sweep Time Coupled

ESW Preset: High Pass 2 MHz | Notch Filter 2.4 G | Notch Filter 5.8 G

DK | Cancel

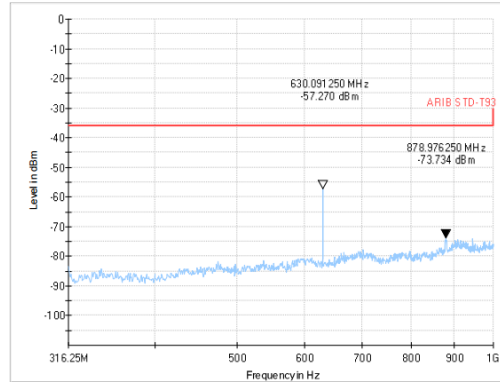
- 316.25 MHz ~ 1 000 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

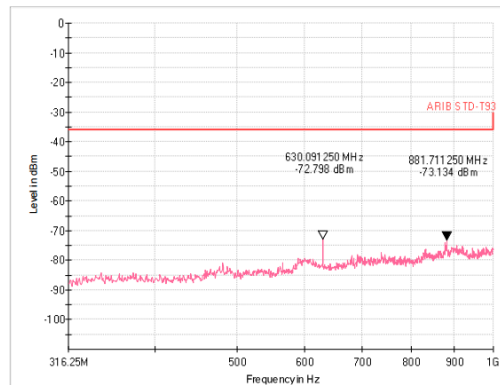


Vertical

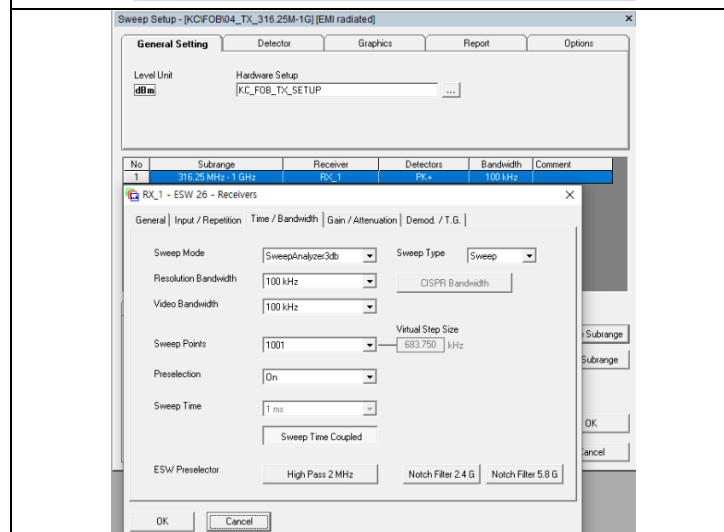
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



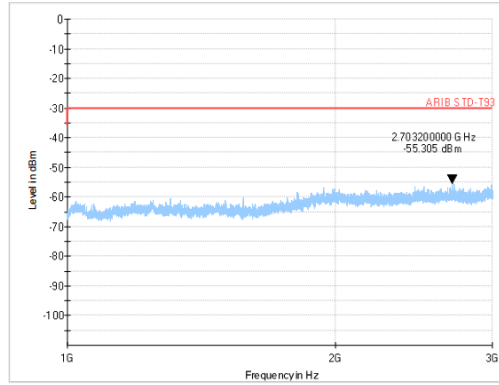
- 1 000 MHz ~ 3 000 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

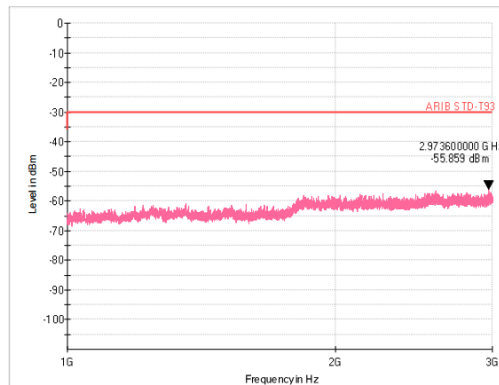


Vertical

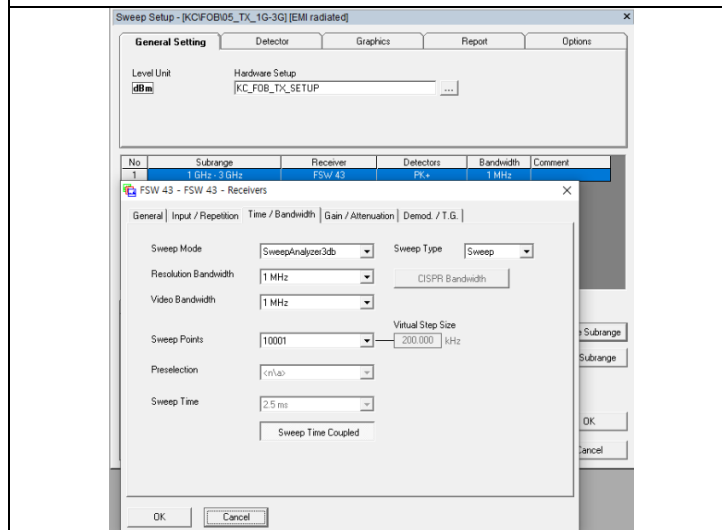
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



Normal Voltage

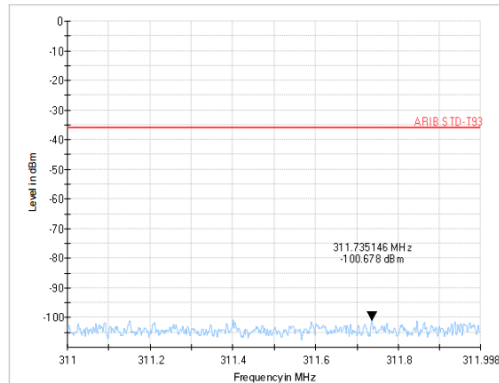
- 311 MHz ~ 311.998 5 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

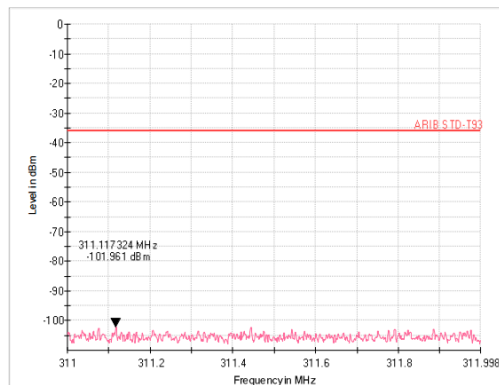


Vertical

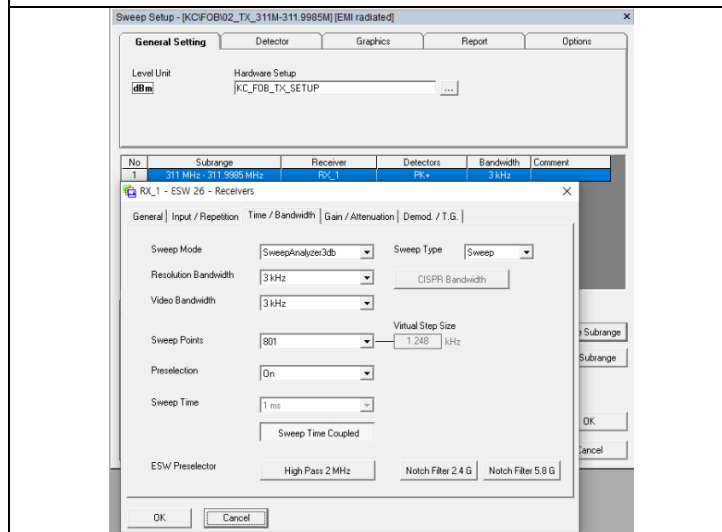
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



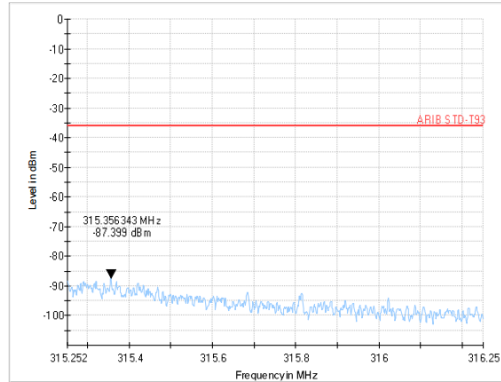
- 315.251 5 MHz ~ 316.25 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

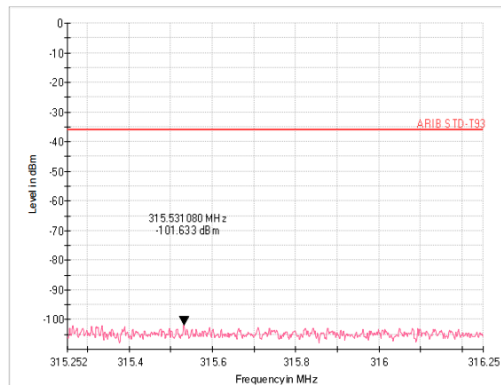


Vertical

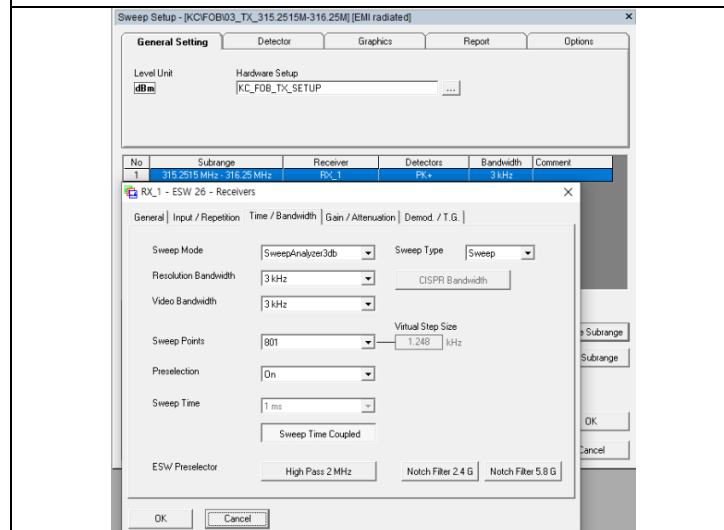
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



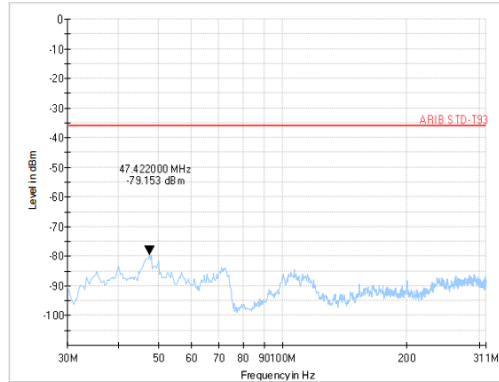
- 30 MHz ~ 311 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

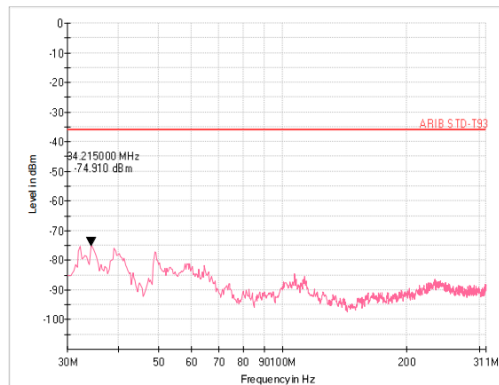


Vertical

EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value

Sweep Setup - [KCFOB01_TX_30M-311M] [EMI radiated]

General Setting | Detector | Graphics | Report | Options

Level Unit: dBm

Hardware Setup: KC_FOB_TX_SETUP

No.	Subrange	Receiver	Detectors	Bandwidth	Comment
1	30 MHz ~ 311 MHz	RX_1	Pk-P	100 kHz	

RX_1 - ESW 26 - Receivers

General | Input / Repetition | Time / Bandwidth | Gain / Attenuation | Demod / T.G.

Sweep Mode: Sweep/Analyze3db | Sweep Type: Sweep

Resolution Bandwidth: 100 kHz | CISPR Bandwidth

Video Bandwidth: 100 kHz

Sweep Points: 1001 | Virtual Step Size: 281.000 kHz

Preselection: On

Sweep Time: 1 ms

Sweep Time Coupled

ESW Preset: High Pass 2 MHz | Notch Filter 2.4 G | Notch Filter 5.8 G

DK | Cancel

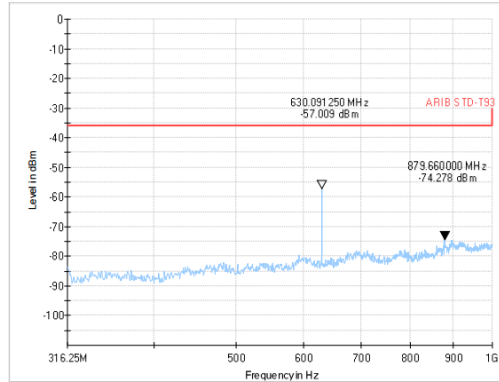
- 316.25 MHz ~ 1 000 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

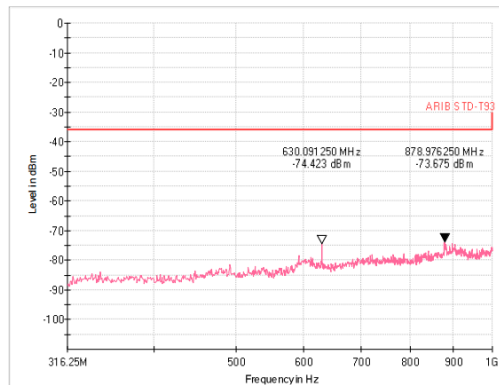


Vertical

EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value

Sweep Setup - [KCFOB04_TX_316.25M-1G] (EMI radiated)

General Setting | Detector | Graphics | Report | Options

Level Unit: dBm | Hardware Setup: KC_FOB_TX_SETUP

No.	Subrange	Receiver	Detectors	Bandwidth	Comment
1	316.25 MHz ~ 1 GHz	Pk1	Pk1	100 kHz	

RX_1 - ESW 26 - Receivers

General | Input / Repetition | Time / Bandwidth | Gain / Attenuation | Demod / T.G.

Sweep Mode: SweepAnalyzer3db | Sweep Type: Sweep

Resolution Bandwidth: 100 kHz | CISPR Bandwidth

Video Bandwidth: 100 kHz

Sweep Points: 1001 | Virtual Step Size: 683.750 kHz

Preselection: On

Sweep Time: 1 ms | Sweep Time Coupled

ESW Preselector: High Pass 2 MHz | Notch Filter 2.4 G | Notch Filter 5.8 G

OK | Cancel

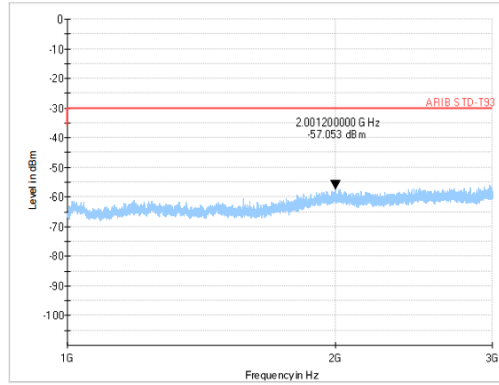
- 1 000 MHz ~ 3 000 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

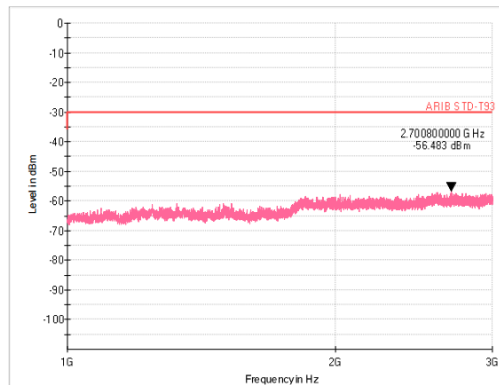


Vertical

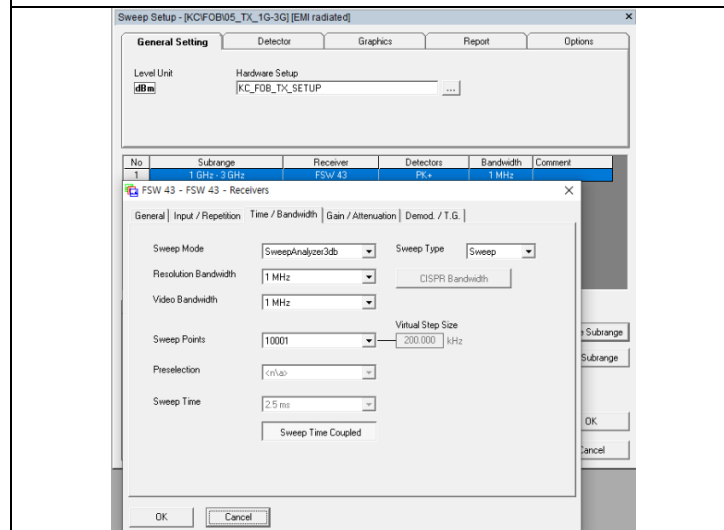
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



High Voltage

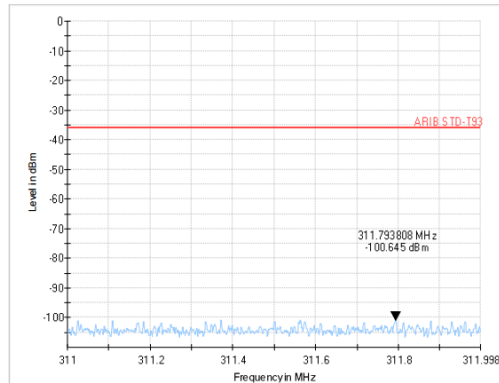
- 311 MHz ~ 311.998 5 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

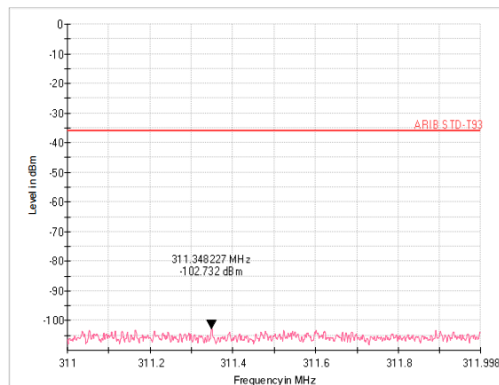


Vertical

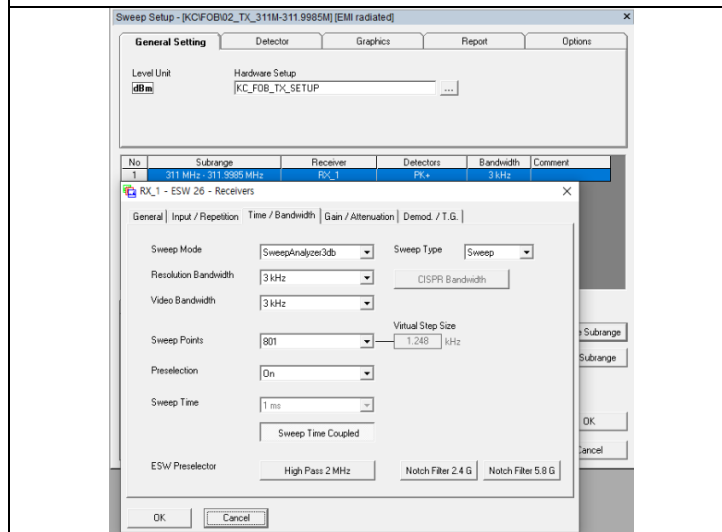
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



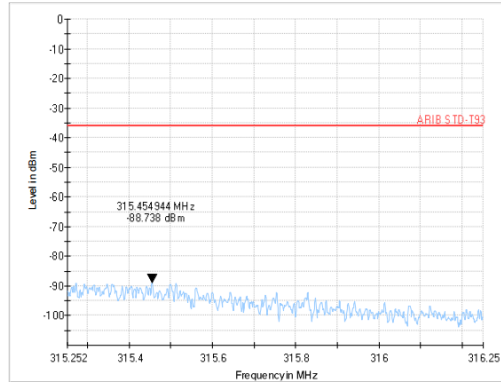
- 315.251 5 MHz ~ 316.25 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

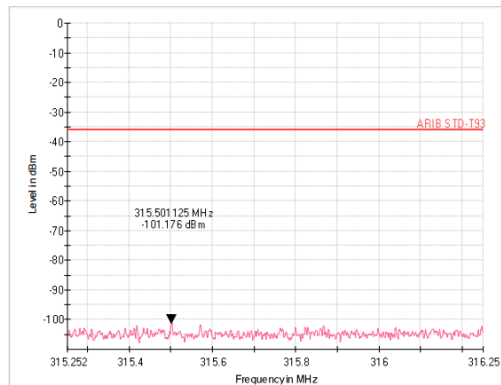


Vertical

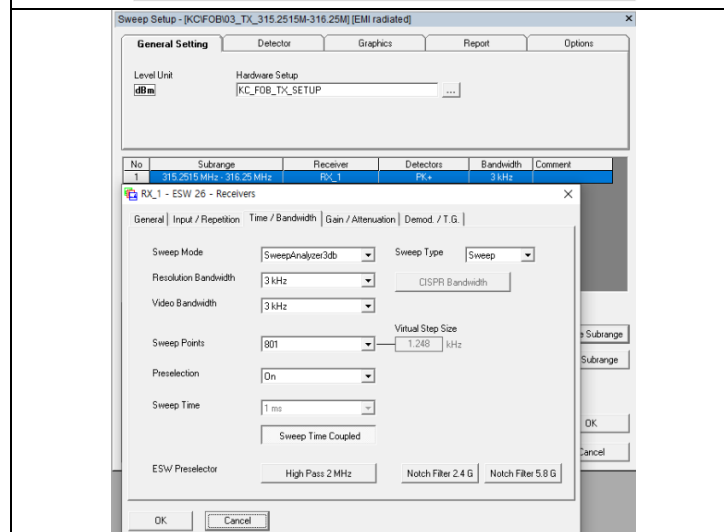
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



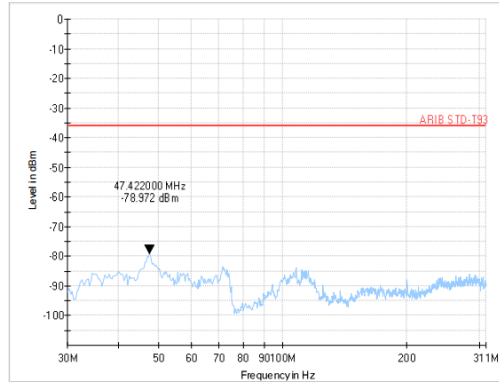
- 30 MHz ~ 311 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

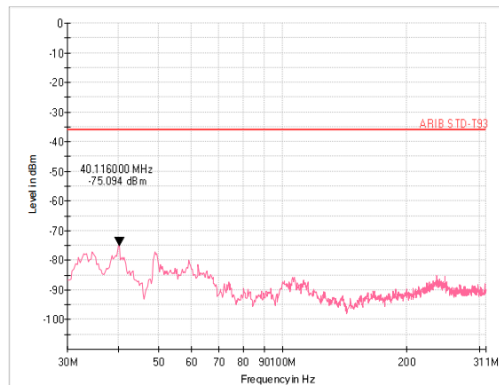


Vertical

EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value

Sweep Setup - [KCFOB01_TX_30M-311M] [EMI radiated]

General Setting | Detector | Graphics | Report | Options

Level Unit: dBm

Hardware Setup: KC_FOB_TX_SETUP

No.	Subrange	Receiver	Detectors	Bandwidth	Comment
1	30 MHz ~ 311 MHz	RX_1	Pk-P	100 kHz	

RX_1 - ESW 26 - Receivers

General | Input / Repetition | Time / Bandwidth | Gain / Attenuation | Demod / T.G.

Sweep Mode: SweepAnalyze3db | Sweep Type: Sweep

Resolution Bandwidth: 100 kHz | CISPR Bandwidth

Video Bandwidth: 100 kHz

Sweep Points: 1001 | Virtual Step Size: 281.000 kHz

Preselection: On

Sweep Time: 1 ms | Sweep Time Coupled

ESW Preset: High Pass 2 MHz | Notch Filter 2.4 G | Notch Filter 5.8 G

DK | Cancel

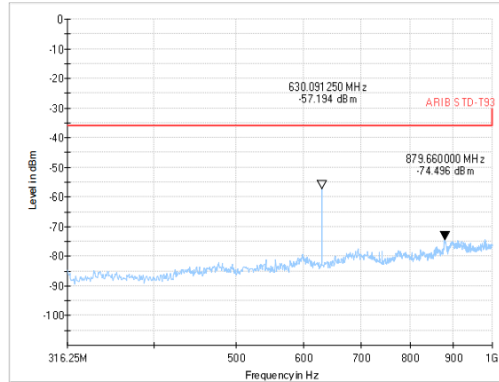
- 316.25 MHz ~ 1 000 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

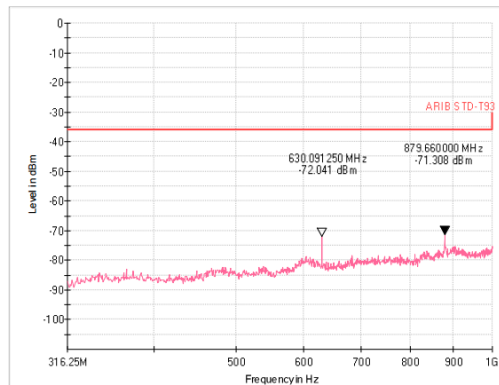


Vertical

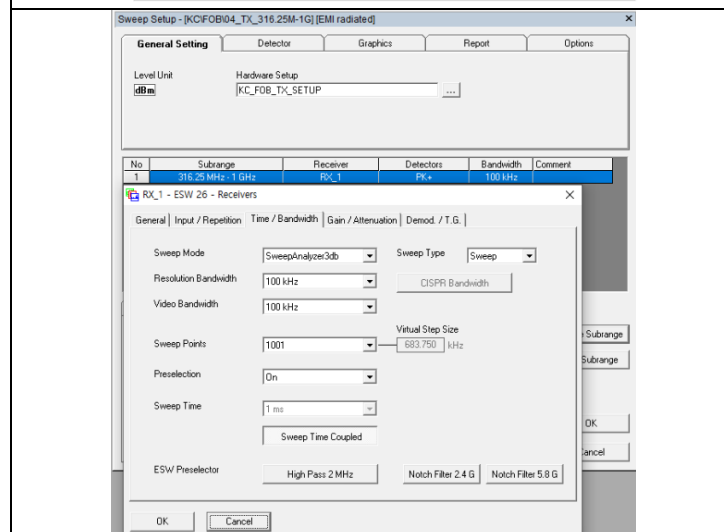
EMC32 Report

Common Information

Test Description: FOB-4F83M33J



Setting Value



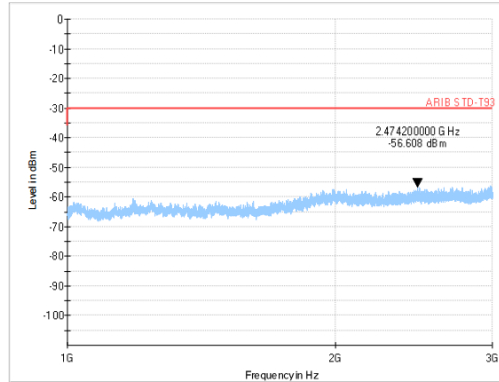
- 1 000 MHz ~ 3 000 MHz

Horizontal

EMC32 Report

Common Information

Test Description: FOB-4F83M33J

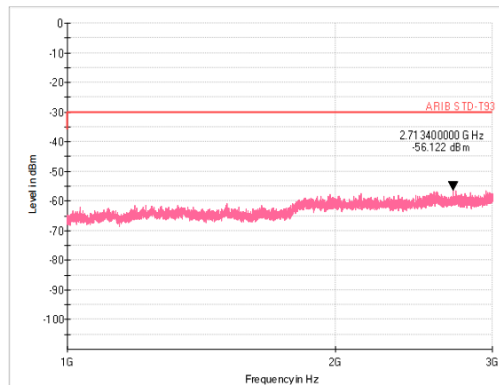


Vertical

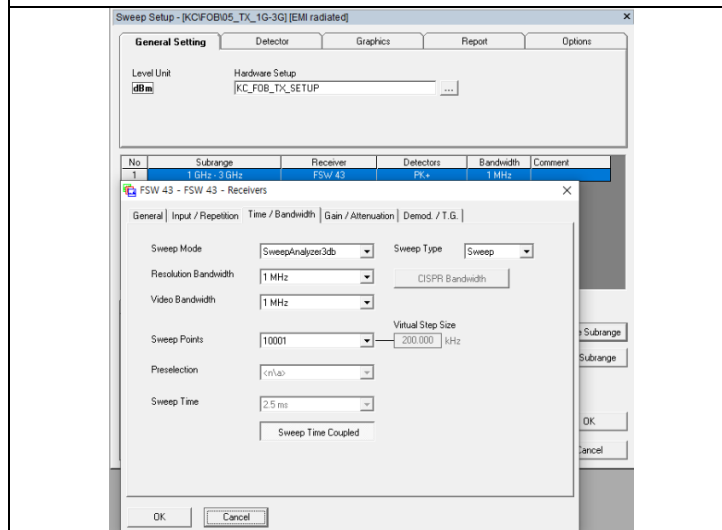
EMC32 Report

Common Information

Test Description: FOB-4F83M33J

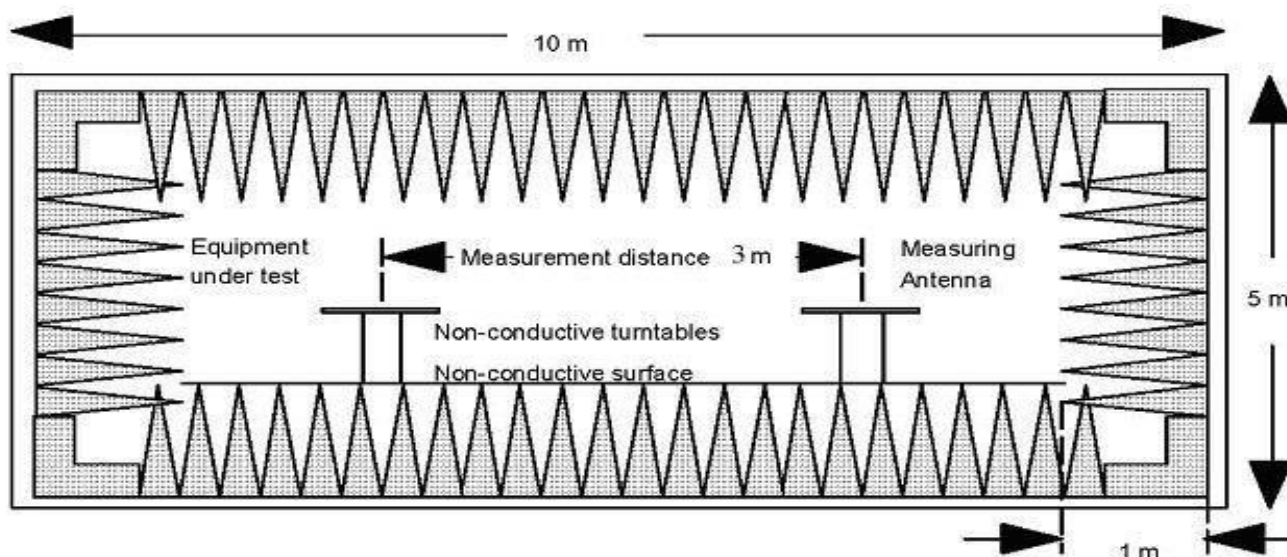


Setting Value



4. Antenna Power and Tolerances for Antenna Power

4.1. Test Setup



4.2. Limit

4.2.1. Antenna Power

Over 312 MHz to 315.25 MHz : 25 μ W or less

Over 312 MHz to 315.05 MHz* : 250 μ W or less

*The center frequency of the band(OBW + frequency tolerance)

4.2.2. Tolerance for Antenna Power

Tolerance for antenna power, which is the maximum permissible tolerance from assigned or rated antenna power, shall be +20 % in the upper limit, without the lower limit.

4.3. Test Procedure

1. Spectrum Analyzer Setting for average power measurement for long burst transmission interval:

Center frequency	:	Measured result of (Frequency and Occupied Bandwidth)
Span	:	0 MHz
RBW	:	3 MHz
VBW	:	Over 3 times the RBW
Sweep time	:	Greater than one burst length
Sweep mode	:	Single
Detector mode	:	Sample

2. Average Power in Burst is the value from 1 using the power measurement function

4.4. Test Result

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

Low Voltage

Frequency (MHz)	Polarity	Reading (dB m)	Level (dB m)	Limit (dB m)	Margin (dB)
315.000 000	H	-27.74	-25.59	-6.02	19.57
315.000 000	V	-39.78	-37.63	-6.02	31.61

Declaration E.I.R.P. (μW)	3.000 000	Declaration E.I.R.P. (dBm)	-25.23
Polarity	H	V	
E.I.R.P. (μW)	2.760 578	0.172 584	
E.I.R.P. (dBm)	-25.59	-37.63	
Tolerance (%)	-7.98	-94.25	

Remark;

- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 (dB)
- Reading values are E.R.P and are averaged within a burst.
- Tolerance (%) = {(E.I.R.P. (μW) – Declaration E.I.R.P. (μW)) / Declaration E.I.R.P. (μW)} x 100
- Instrument used for testing includes spatial loss as an offset.

Normal Voltage

Frequency (MHz)	Polarity	Reading (dB m)	Level (dB m)	Limit (dB m)	Margin (dB)
315.000 000	H	-27.71	-25.56	-6.02	19.54
315.000 000	V	-39.69	-37.54	-6.02	31.52

Declaration E.I.R.P. (μW)	3.000 000	Declaration E.I.R.P. (dBm)	-25.23
Polarity	H	V	
E.I.R.P. (μW)	2.779 713	0.176 198	
E.I.R.P. (dBm)	-25.56	-37.54	
Tolerance (%)	-7.34	-94.13	

Remark;

- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 (dB)
- Reading values are E.R.P and are averaged within a burst.
- Tolerance (%) = {(E.I.R.P. (μW) – Declaration E.I.R.P. (μW)) / Declaration E.I.R.P. (μW)} x 100
- Instrument used for testing includes spatial loss as an offset.

High Voltage

Frequency (MHz)	Polarity	Reading (dB m)	Level (dB m)	Limit (dB m)	Margin (dB)
314.997 005	H	-27.91	-25.76	-6.02	19.74
314.997 005	V	-39.60	-37.45	-6.02	31.43

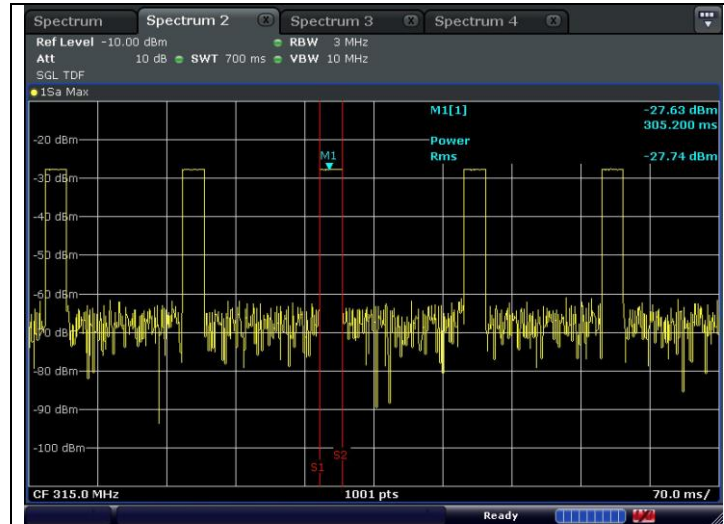
Declaration E.I.R.P. (μ W)	3.000 000	Declaration E.I.R.P. (dBm)	-25.23
Polarity	H	V	
E.I.R.P. (μ W)	2.654 606	0.179 887	
E.I.R.P. (dBm)	-25.76	-37.45	
Tolerance (%)	-11.51	-94.00	

Remark;

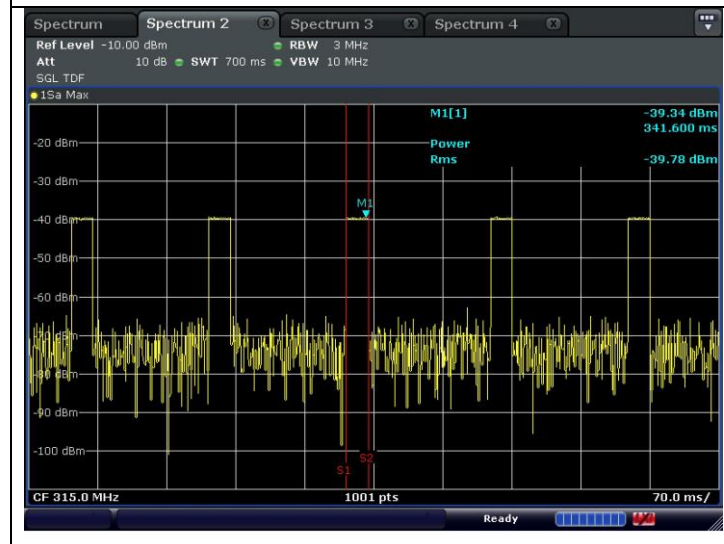
- Level (dB m) = E.I.R.P. = E.R.P. + 2.15 (dB)
- Reading values are E.R.P and are averaged within a burst.
- Tolerance (%) = $\{(E.I.R.P. (\mu W) - \text{Declaration E.I.R.P.} (\mu W)) / \text{Declaration E.I.R.P.} (\mu W)\} \times 100$
- Instrument used for testing includes spatial loss as an offset.

Low Voltage

Horizontal

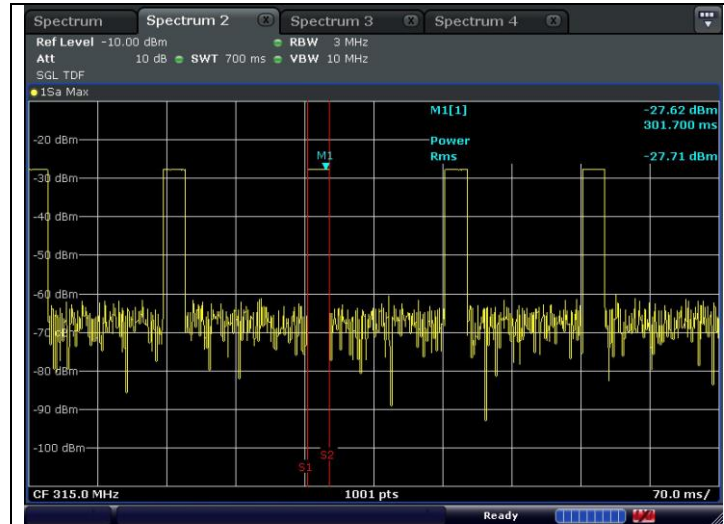


Vertical

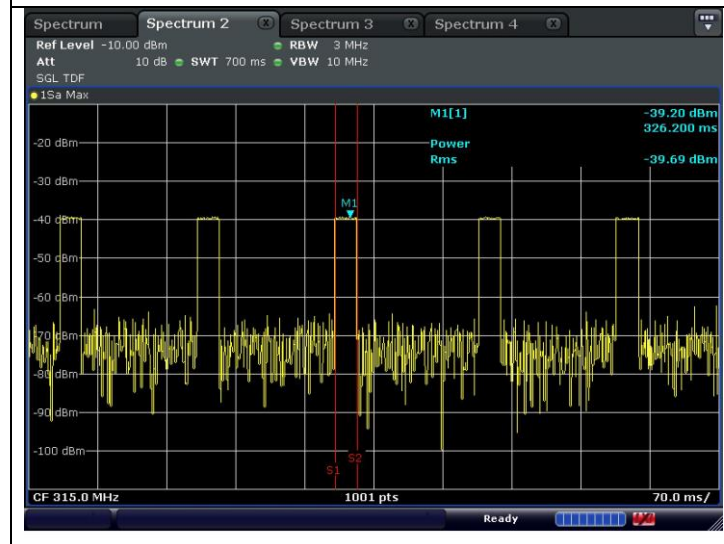


Normal Voltage

Horizontal

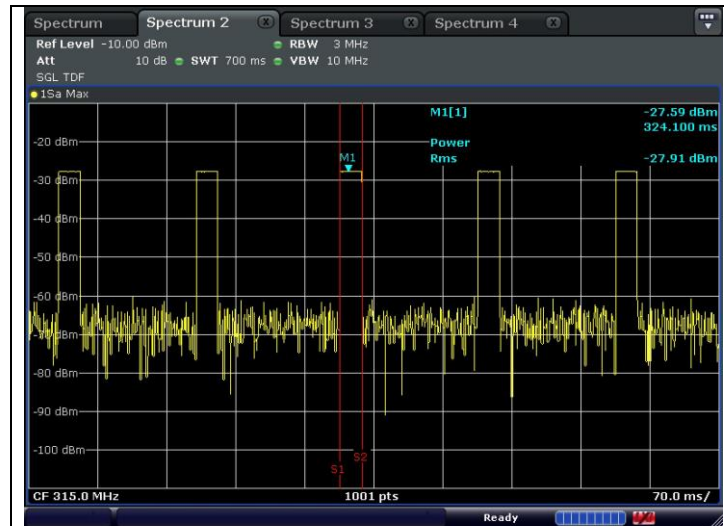


Vertical

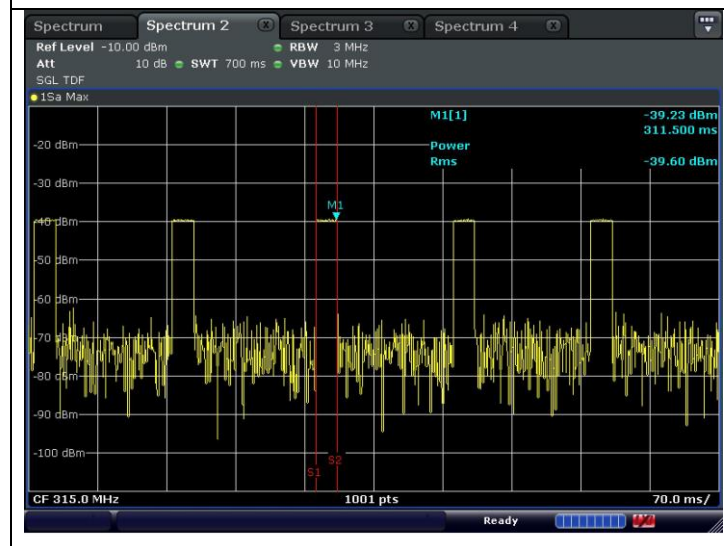


High Voltage

Horizontal

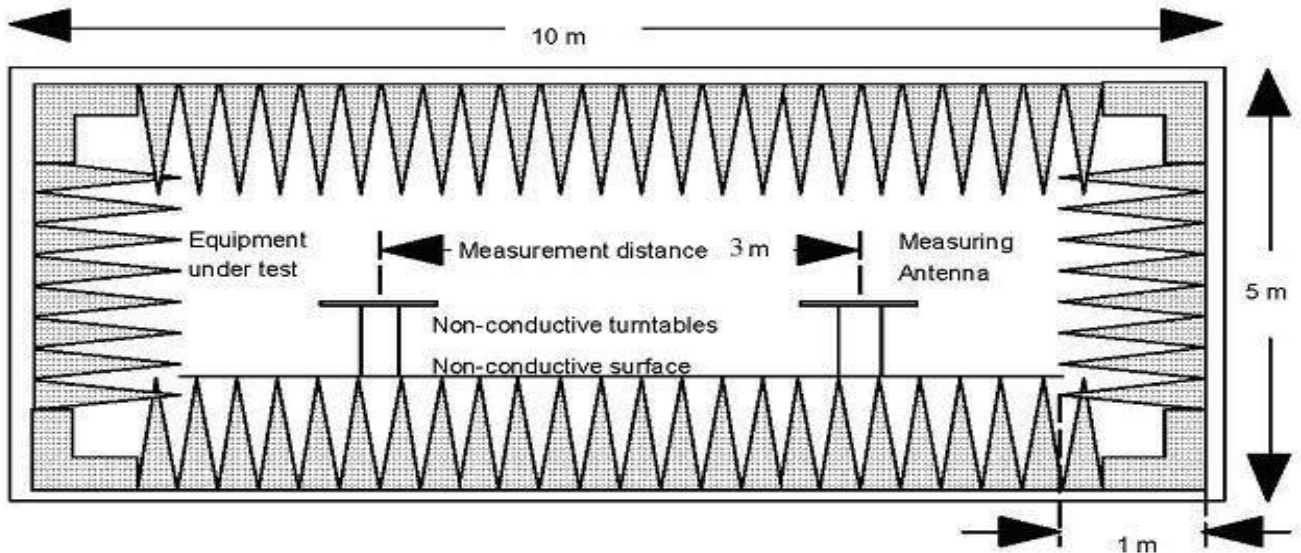


Vertical



5. Transmission Time Restriction

5.1. Test Setup



5.2. Limit

(i) The radio equipment that does not transmit periodically shall have the function to limit one transmission time within 5 seconds, although manually operated transmission allows one transmission time to be within 90 seconds.

(ii) The radio equipment that transmit periodically shall have the function to automatically limit the transmission time for one transmission time within 1 second, with one transmission halt time being more than 10 seconds and no less than 30 times for the transmission time. It is noted that if the radio equipment is used for safety operation of an auto vehicle or any other vehicles and in the unavoidable reason, the transmission halt time of the radio equipment does not require 10 seconds or more.

5.3. Test Procedure

1. Spectrum Analyzer Settings

Center frequency	: Test frequency
Span	: 0 Hz
RBW	: Approximately 1 MHz
VBW	: Same as RBW
Input level	: Carrier level should be sufficiently greater than residual noise of spectrum analyzer
Sweep time	: Approximately 10 seconds (for manual transmission: approximately 100 seconds)
Sweep mode	: Single
Detector	: Positive peak

5.4. Test Result

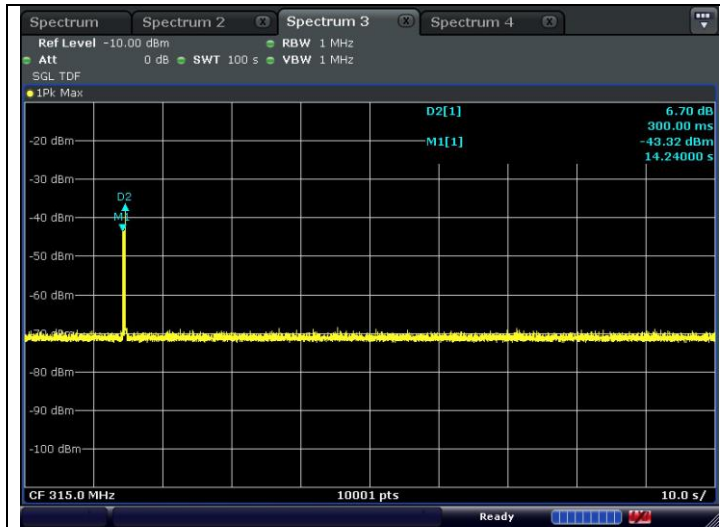
Ambient temperature : $(23 \pm 1) ^\circ\text{C}$
 Relative humidity : 47 % R.H.

Test Voltage (V)	Type	Result (s)	Limit
V _{Low} = 2.70	One transmission	0.3	90 sec or less
V _{Normal} = 3.00	One transmission	0.3	90 sec or less
V _{High} = 3.30	One transmission	0.3	90 sec or less

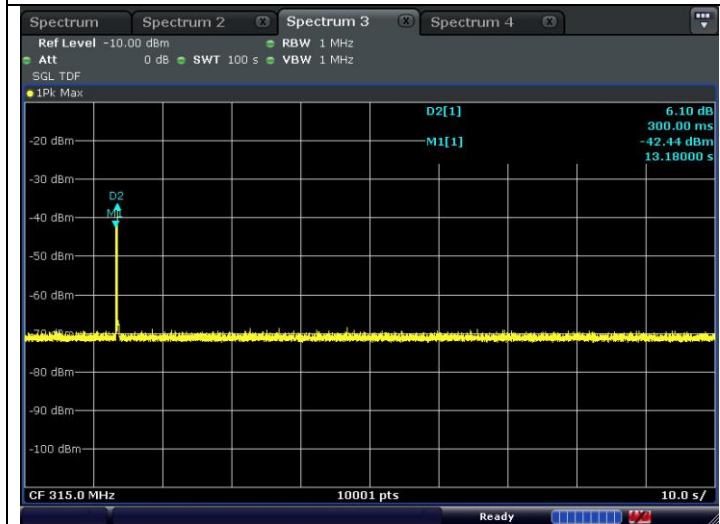
Remark;

- Instrument used for testing includes spatial loss as an offset.

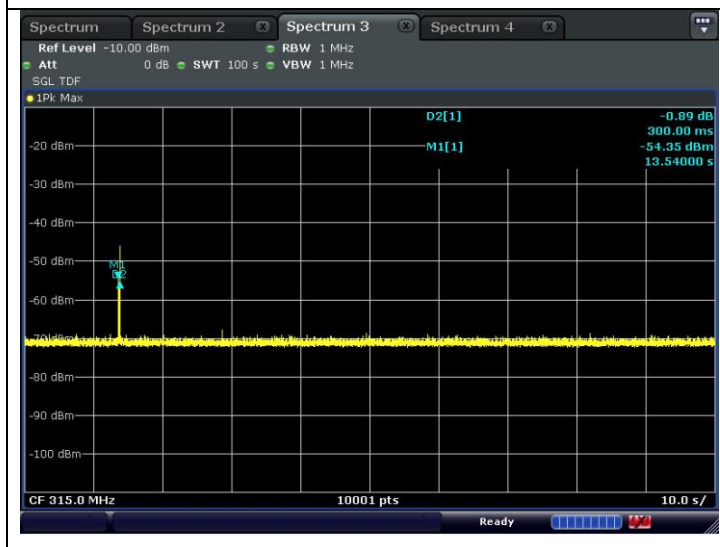
Low Voltage



Normal Voltage



High Voltage



- End of the Test Report -