

Produkte
Products

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Auftraggeber:	Magna Closures
<i>Client:</i>	521 Newpark Blvd, Newmarket, Ontario, Canada L3Y 4X7

Gegenstand der Prüfung:	Swift Lift In-Car Remote
<i>Test item:</i>	

Bezeichnung:	SL00300	Serien-Nr.:	Engineering Sample
<i>Identification:</i>		<i>Serial No.</i>	

Wareneingangs-Nr.:	1803340015	Eingangsdatum:	07.08.2018
<i>Receipt No.:</i>		<i>Date of receipt:</i>	

Prüfort:	Refer Page 5 of 16 for test facilities
<i>Testing location:</i>	

Prüfgrundlage:	FCC Part 15 Subpart C 15.231
<i>Test specification:</i>	ANSI C63.10-2013

Prüfergebnis:	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).
<i>Test Result:</i>	<i>The test items passed the test specification(s).</i>

Prüflaboratorium:	TÜV Rheinland (India) Pvt. Ltd.
<i>Testing Laboratory:</i>	27/B, 2nd corss, Electronic City Phase 1 Bangalore – 560 100. India FCC Test Site Registration no.: 496599

geprüft / tested by:	kontrolliert / reviewed by:
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07.08.2018	Vinay H Engineer	
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20.08.2018	Shrikanth S Naik Assistant Manager	
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Datum	Name/Stellung	Unterschrift	Datum	Name/Stellung	Unterschrift
<i>Date</i>	<i>Name/Position</i>	<i>Signature</i>	<i>Date</i>	<i>Name/Position</i>	<i>Signature</i>

Sonstiges / Other Aspects:	FCC ID :2AQPJ-00300
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Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested
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Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

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TEST SUMMARY

Section	Test item	Result
15.231 (a) (1)	Conditions for Intentional Radiator to comply with Periodic Operation	Pass
15.231 (c)	20 dB Bandwidth & Occupied Bandwidth	Pass
15.231 (b) / 15.209 & 15.205	Field strength of fundamental & Field strength of spurious emissions	Pass
15.207	Conducted emission on A.C power lines	NA

NA -> Not Applicable

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1 GENERAL REMARKS

1.1 Complimentary Materials

All attachments are integral part of this test report.

1: TEST SETUP PHOTOS

2: EUT EXTERNAL PHOTOS

3: EUT INTERNAL PHOTOS

4: FCC LABEL AND LABEL LOCATION

5: BLOCK DIAGRAM

6: SPECIFICATION OF EUT

7: SCHEMATIC DIAGRAM

8: BILL OF MATERIAL

9: USER MANUAL

10: MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

2 TEST SITES

2.1 Testing Facilities

TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.

TUV Rheinland (India) Private Limited
27/B, 2nd corss, Electronic City Phase 1
Bangalore – 560 100. India

2.2 List of Test and Measurement Instruments

Table 1: Test and measurements instrument used

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
Spectrum Analyser	Agilent	E4407B	US41192772	29-03-2019	Yearly	Antenna - Port Measurements
10 dB RF Attenuator	Huber-Suhner Electronics Pvt. Ltd.,	6810.17.A	770041	27-03-2019	Yearly	
RF Cable (RF-1) 1 meter	Huber-Suhner Electronics Pvt. Ltd.,	ST18/SMAm /SMAm/36	-	06-09-2018	Yearly	
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	24-10-2018	Yearly	Radiated Spurious Emission
Active loop antenna	Frankonia	LAX-10	LAX-10-800	15-01-2019	Yearly	
Biconical Antenna	Schwarzbeck mess-elektronik	VHBB-9124 / BBA-9106	9124-656	09-01-2019	Yearly	
Log-Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP-9111B	9111B-111	16-01-2019	Yearly	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	17-05-2019	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

In Car Remote device is a remote control with three user's buttons that allows a user to operate a Garage Door Opener (GDO) from a distance. The device is operated by a user using one of the buttons. The message from the device to a receiver is identical, with exception of the button field.

3.2 Ratings and System Details

Table 2: Ratings and System Details

Operating frequency	315 MHz
Modulation	On – Off Keying
Encoding	Manchester
Baud rate	2400 bps
Number of antennas	1
Antenna type	PCB Trace Antenna
Antenna gain	1.858 dBi
Supply Voltage to Product	3 VDC
Environmental conditions	Temp Range: -20°C to +40°C

3.3 Measurement Uncertainty:

Table 3: Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±3 °C

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle transmission to obtain maximum emissions.

4.2 Test Operation and Test Software

Testing software was used to enable the continuous transmission.

Test Software: CR_Test_SW

Software Version: 02.001

Hardware Version used: REV 2.3

4.3 Special Accessories and Auxiliary Equipment

- None

4.4 Countermeasures to achieve EMC Compliance

- None

4.5 List of Frequencies and Frequency bands

Center Frequency = 315 MHz

Note:

- The test was performed with the following power settings of 10dBm during the transmission,
- Testing was performed on the sample with the TUV Internal Identification Number : 1803340015-1-1-2

5 RADIATED TEST METHODOLOGY

5.1 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and measurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.

5.1.1 Test Setup Configuration

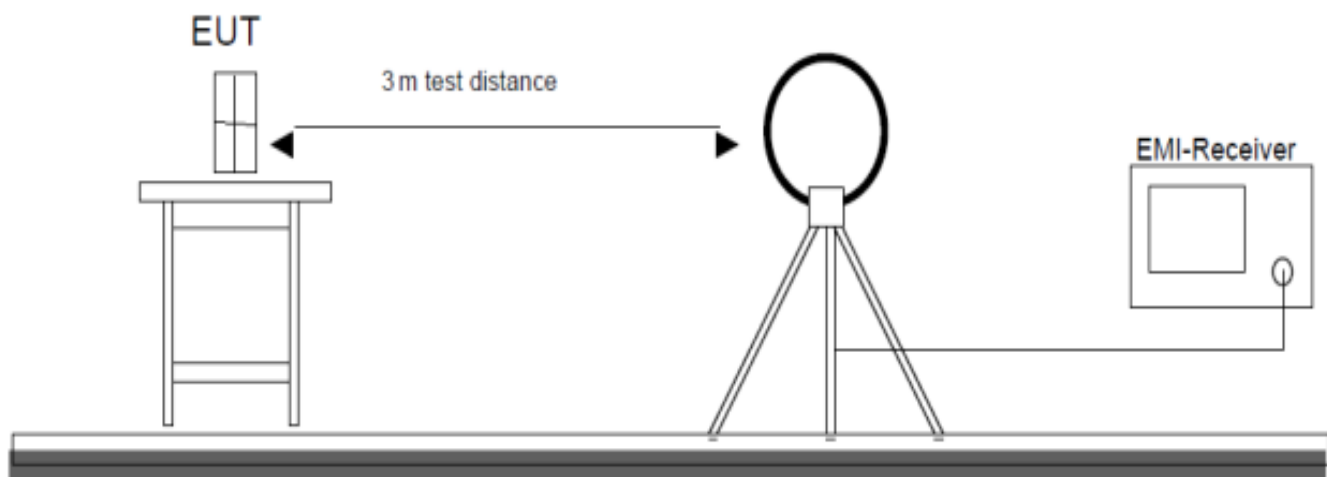


Figure 1: Frequency Range 9 kHz- 30 MHz

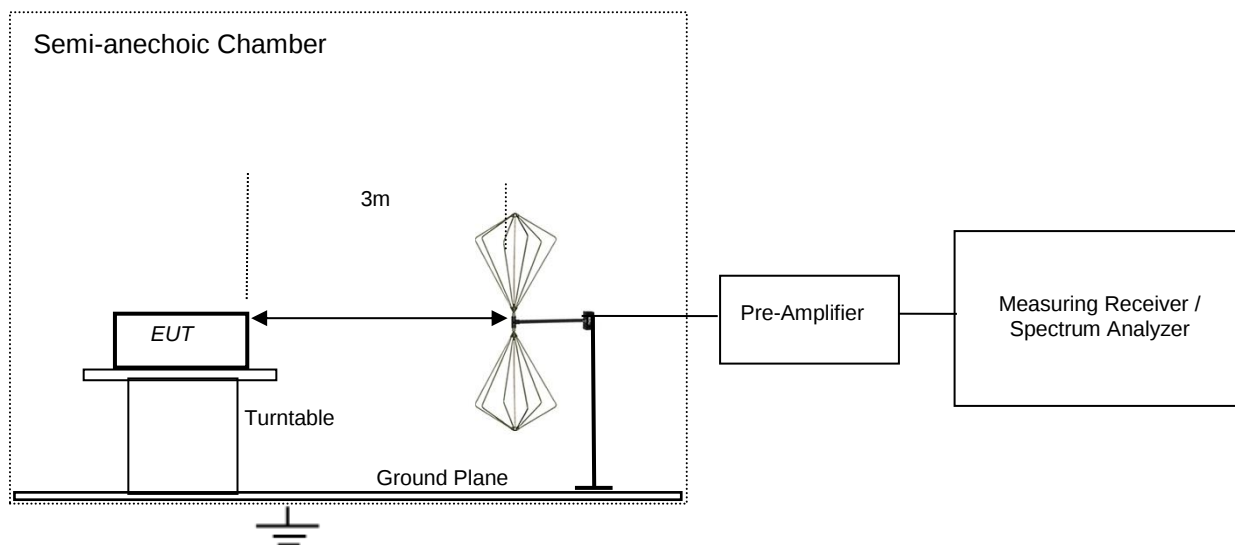


Figure 2: Frequency Range 30 MHz – 200 MHz

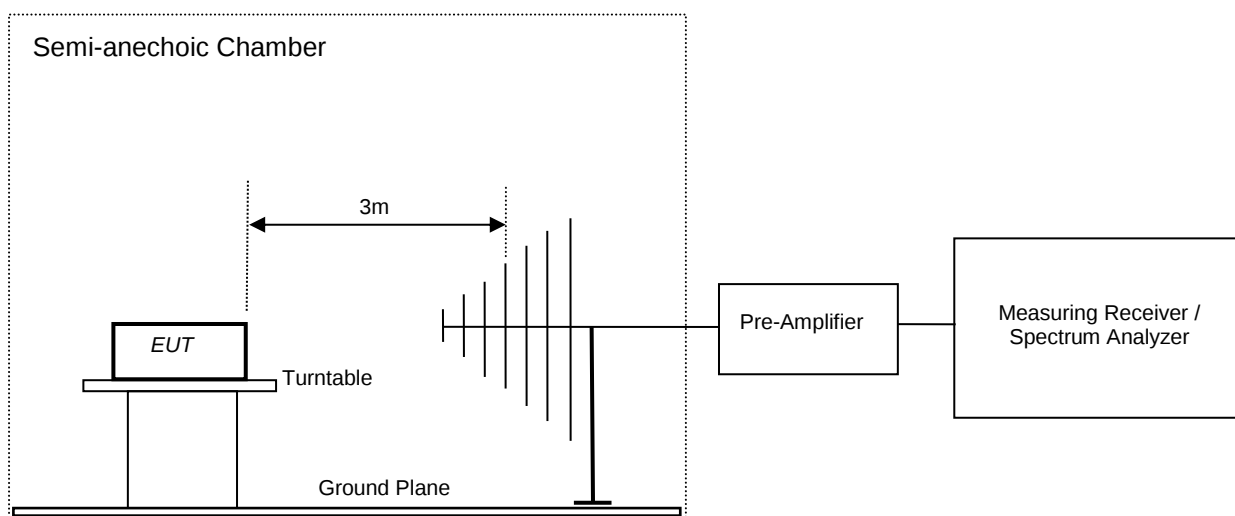


Figure 3: Frequency Range 200 MHz - 1GHz

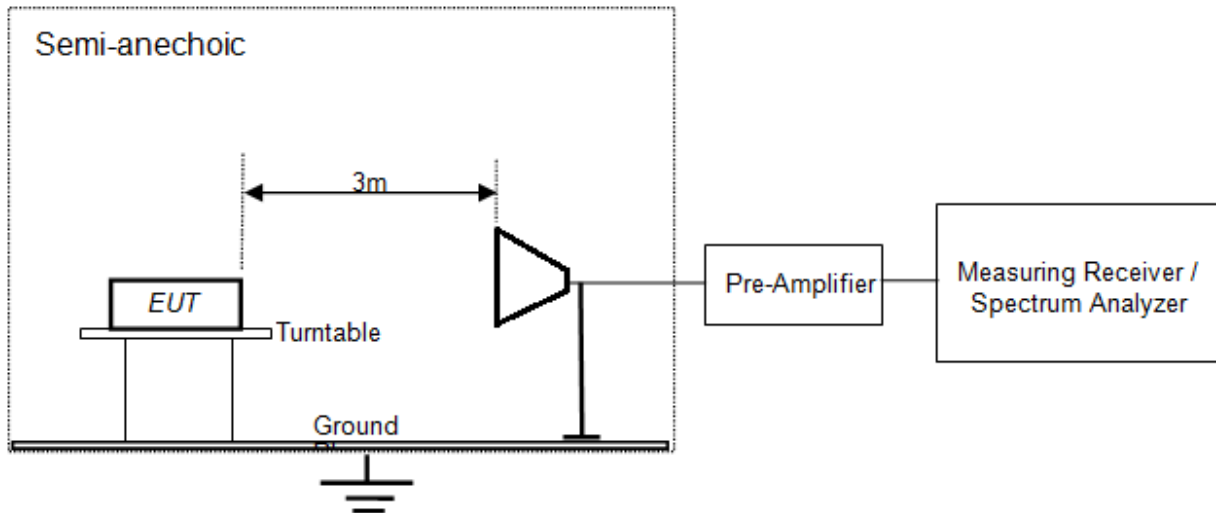


Figure 4: Frequency Range above 1 GHz

6 Test Results

6.1 Conditions for intentional radiator to comply with periodic Operation

Result

Pass

Test Specification FCC part 15 Subpart C 15.231 (a) (1)

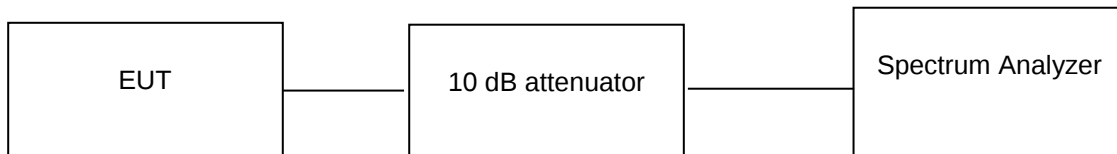
Measurement Bandwidth 10 kHz

Detector Peak

Requirement

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

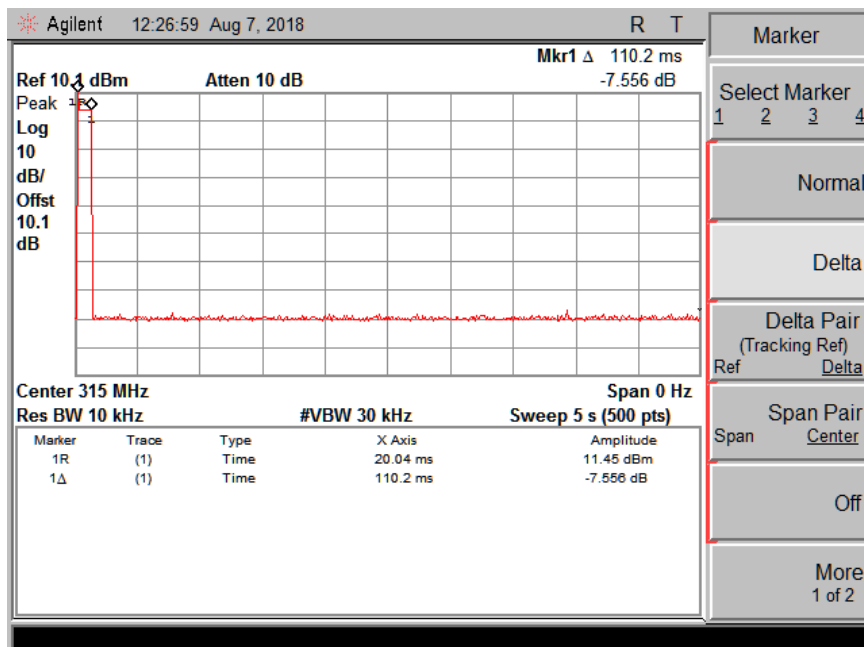
Test Method:



Test results:

10 dB attenuator + 0.1 dB Cable loss = 10.1 dB offset is considered in the below result at 315MHz frequency.

Transmission time



Frequency (MHz)	Pulse Width (Second)	Limit (Second)	Result
315	0.1102	5	Pass

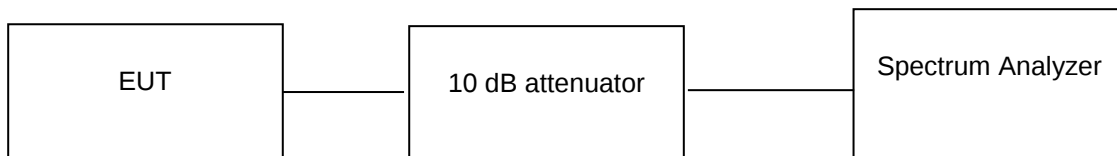
6.2 20 dB Bandwidth & Occupied Bandwidth

Result

Pass

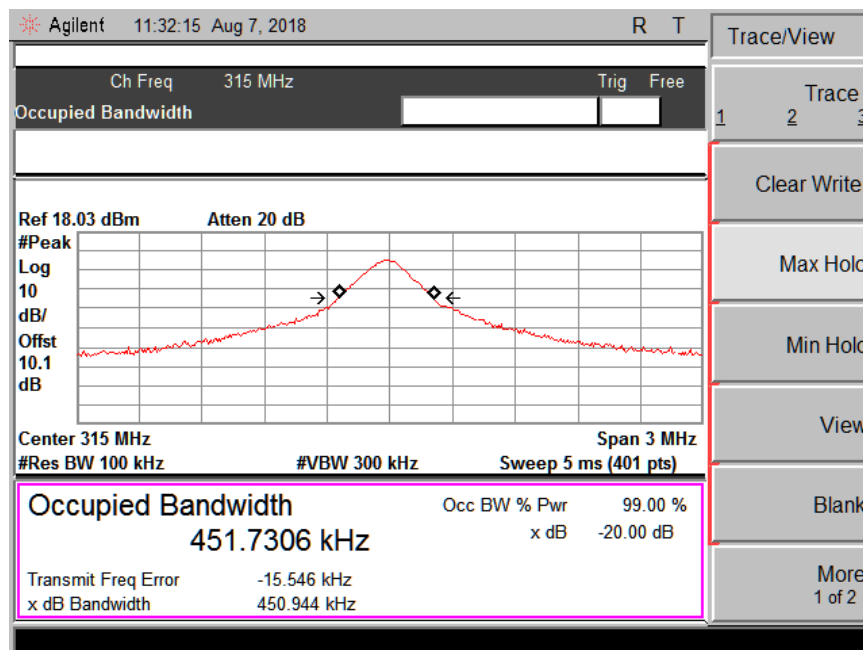
Test Specification	FCC Part 15 Subpart C Section 15.231 (c)
Detector Function	Peak
Port of testing	Antenna port
Requirement	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

Test Method:



Test results:

10 dB attenuator + 0.1 dB Cable loss = 10.1 dB offset is considered in the below result at 315MHz frequency.



Channel Frequency (MHz)	Occupied Bandwidth (kHz)	-20 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
315.00	451.73	450.944	787.5	-336.556	Pass

6.3 Field strength of Fundamental and Field strength of Spurious Emissions

Result

Pass

Test Specification	FCC part 15 Subpart C Section 15.231 (b) / (15.209 & 15.205)
Test Method	ANSI C 63.10 – 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3 m
Detector	QP for frequency below 1 GHz & Average for frequency above 1 GHz
Requirement	As per the limits mentioned in the below table

Limits for Radiated Emission of Section 15.231:

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Distance of Measurement (m)
40.66 – 40.70	2,250	225	3
70 – 130	1,250	125	3
130 – 174	1,250 to 3,750*	125 to 375	3
174 – 260	3,750	375	3
260 – 470	3,750 to 12,500*	375 to 1,250	3
Above 470	12,500	1,250	3

*-> Linear interpolations

Remarks:

(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

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

(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

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Test results:

Field strength of Fundamental

Polarization	Frequency (MHz)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Vertical	315	45.04	75.6	-30.56
Horizontal	315	51.41	75.6	-24.19

Note: Field strength(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) – Pre amplifier Gain(dBi)

Field strength of Spurious emissions

Test results in the frequency range of 9 kHz to 30 MHz

No emissions found in frequency range of 9 kHz to 30 MHz

Test results in the frequency range of 30 MHz to 200 MHz

No emissions found in frequency range of 30 MHz to 200 MHz

Test results in the frequency range of 200MHz – 1GHz

Polarization	Frequency (MHz)	Field strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Vertical	630	31.25	55.6	-24.35
	945	33.28	55.6	-22.32
Horizontal	630	34.16	55.6	-21.44
	945	40.55	55.6	-15.05

Note: Field strength(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) – Pre amplifier Gain(dBi)

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Test results in the frequency range of 1GHz – 4GHz

Polarization	Frequency (MHz)	Detector	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	1260	Peak	37.03	75.6	-38.57
		Average	33.29	55.6	-22.31
	1575	Peak	43.58	74	-30.42
		Average	41.89	54	-12.11
	1890	Peak	43.58	75.6	-32.02
		Average	41.89	55.6	-13.71
	2205	Peak	33.28	74	-40.72
		Average	22.71	54	-31.29
	2520	Peak	31.87	75.6	-43.73
		Average	21.59	55.6	-34.01
	2835	Peak	36.20	74	-37.8
		Average	28.43	54	-25.57
Horizontal	1260	Peak	38.02	75.6	-37.58
		Average	30.03	55.6	-25.57
	1260	Peak	44.86	75.6	-30.74
		Average	43.43	55.6	-12.17
	1575	Peak	48.71	74	-25.29
		Average	47.81	54	-6.19
	1890	Peak	48.71	75.6	-26.89
		Average	47.81	55.6	-7.79
	2205	Peak	36.32	74	-37.68
		Average	30.87	54	-23.13
	2520	Peak	34.18	75.6	-41.42
		Average	23.26	55.6	-32.34
	2835	Peak	35.21	74	-38.79
		Average	27.29	54	-26.71
	3150	Peak	39.01	75.6	-36.59
		Average	31.74	55.6	-23.86

Note: Field strength(dBµV/m) = Measured Value(dBµV) + Cable Loss(dB) + Antenna Factor(dB/m) – Pre amplifier Gain(dBi)

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END OF TEST REPORT