

Report No.: JYTSZ-R12-2200974

FCC REPORT

Applicant:	Hangzhou Roombanker Technology Co., Ltd		
Address of Applicant:	A#801 Wantong center, Hangzhou, China		
Equipment Under Test (E	UT)		
Product Name:	Smart Ceiling LTE Gateway		
Model No.:	DSGW-090		
FCC ID:	2AUXBDSGW-090		
Applicable Standards:	FCC CFR Title 47 Part 15C (§15.247)		
Date of Sample Receipt:	06 May, 2022		
Date of Test:	07 May, to 02 Jun., 2022		
Date of Report Issued:	02 Jun., 2022		
Test Result:	PASS		

Tested by:	Tanet Wei Test Engineer	Date:	02 Jun., 2022
Reviewed by:	Reject Engineer	Date:	02 Jun., 2022
Approved by:	检验检测专用章 Manager	Date:	02 Jun., 2022

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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2 Version

Version No.	Date	Description
00	02 Jun., 2022	Original



3 Contents

			Page
1	COV	/ER PAGE	1
2	VER	SION	2
3		ITENTS	
4		IERAL INFORMATION	
	4.1 4.2	CLIENT INFORMATION GENERAL DESCRIPTION OF E.U.T	
	4.3 4.4	TEST ENVIRONMENT AND MODE	5
	4.5	MEASUREMENT UNCERTAINTY	5
	4.6 4.7	Additions to, deviations, or exclusions from the method Laboratory Facility	6
	4.8 4.9	LABORATORY LOCATION TEST INSTRUMENTS LIST	
5	MEA	ASUREMENT SETUP AND PROCEDURE	9
	5.1 5.2 5.3	TEST CHANNEL TEST SETUP TEST PROCEDURE	9
6	TES	T RESULTS	
	6.1 6.1.1 6.1.2		
	6.2	ANTENNA REQUIREMENT AC Power Line Conducted Emission	14
	6.3 6.4	EMISSIONS IN RESTRICTED FREQUENCY BANDS	17
	6.5	EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS	21



4 General Information

4.1 Client Information

Applicant:	Hangzhou Roombanker Technology Co., Ltd	
Address:	A#801 Wantong center, Hangzhou, China	
Manufacturer:	Hangzhou Roombanker Technology Co., Ltd.	
Address:	A#801 Wantong center, Hangzhou, China	

4.2 General Description of E.U.T.

Product Name:	Smart Ceiling LTE Gateway
Model No.:	DSGW-090
Operation Frequency:	2405MHz~2480MHz (IEEE 802.15.4)
Channel numbers:	16 for (IEEE 802.15.4)
Channel separation:	5 MHz
Modulation technology:	OQPSK
(IEEE 802.15.4)	
Data speed(IEEE 802.15.4):	250kbps
Antenna Type:	Internal Antenna
Antenna gain:	3.79 dBi
AC Adapter:	Model No.: KA12C-0502000US
	Input: AC100-240V, 50/60Hz 0.35A
	Output: DC 5.0V, 2A
Test Sample Condition:	The applicant provided engineering samples for staying in continuously transmitting for testing.



4.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation

The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))				
Conducted Emission for LISN (9kHz ~ 150kHz)	±3.11 dB				
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.62 dB				
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	±5.34 dB				
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	±5.34 dB				
Radiated Emission (30MHz ~ 1GHz) (10m SAC)	±4.32 dB				
Note: All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The					
measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-					
and can be compared directly to specified limit to determine co	ompliance.				

4.6 Additions to, deviations, or exclusions from the method

No



4.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Designation No.: CN1211

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

ISED – CAB identifier.: CN0021

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

• CNAS - Registration No.: CNAS L15527

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

• A2LA - Registration No.: 4346.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

4.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd. Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xingiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China. Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info-JYTee@lets.com, Website: http://jvt.lets.com



4.9 Test Instruments list

Radiated Emission(3m SAC):						
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)	
3m SAC	ETS	9m*6m*6m	WXJ001-1	01-19-2021	01-18-2024	
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-17-2022	02-16-2023	
Biconical Antenna	Schwarzbeck	VUBA9117	WXJ002-1	06-20-2021	06-19-2022	
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-17-2022	02-16-2023	
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-3	06-18-2021	06-17-2022	
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-5	04-07-2022	04-06-2023	
Horn Antenna	Schwarzbeck	BBHA9170	WXJ002-6	04-07-2022	04-06-2023	
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	02-17-2022	02-16-2023	
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	02-17-2022	02-16-2023	
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA- 180400G45B	WXJ002-7	03-30-2022	03-29-2023	
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	02-17-2022	02-16-2023	
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ004-2	11-27-2021	11-26-2022	
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	02-17-2022	02-16-2023	
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN- 8M	WXG001-5	02-17-2022	02-16-2023	
Coaxial Cable (18GHz ~ 40GHz)	JYTSZ	JYT3M-40G-SS- 8M	WXG001-7	02-17-2022	02-16-2023	
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N	I/A	
Test Software	Tonscend	TS+		Version: 3.0.0.1		

Radiated Emission(10m SAC):						
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)	
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024	
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	03-30-2022	03-29-2023	
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	03-30-2022	03-29-2023	
EMI Test Receiver	R&S	ESR 3	WXJ090-3	03-30-2022	03-29-2023	
EMI Test Receiver	R&S	ESR 3	WXJ090-4	03-30-2022	03-29-2023	
Low Pre-amplifier	Bost	LNA 0920N	WXG002-3	03-30-2022	03-29-2023	
Low Pre-amplifier	Bost	LNA 0920N	WXG002-4	03-30-2022	03-29-2023	
Cable	Bost	JYT10M-1G-NN-10M	XG002-7	03-30-2022	03-29-2023	
Cable	Bost	JYT10M-1G-NN-10M	XG002-8	03-30-2022	03-29-2023	
Test Software	R&S	EMC32		Version: 10.50.40)	



Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Manage No.	Cal.Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESR3	WXJ003-2	10-21-2021	10-20-2022
RF Switch	TOP PRECISION	RSU0301	WXG003	02-17-2022	02-16-2023
LISN	Schwarzbeck	NSLK 8127	QCJ001-13	02-17-2022	02-16-2023
LISN	Rohde & Schwarz	ESH3-Z5	WXJ005-1	06-18-2021	06-17-2022
LISN Coaxial Cable (9kHz ~ 30MHz)	JYTSZ	JYTCE-1G-NN-2M	WXG003-1	02-17-2022	02-16-2023
Test Software	AUDIX	E3	V	ersion: 6.110919	b

Conducted Method:						
Test Equipment	Manufacturer	Model No.	Manage No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)	
Spectrum Analyzer	Keysight	N9010B	WXJ004-3	10-25-2021	10-24-2022	
Power Detector Box	MWRFTEST	MW100-PSB	WXJ007-4	10-25-2021	10-24-2022	
RF Control Unit	MWRFTEST	MW100-RFCB	WXG006	N/A		
Test Software	MWRFTEST	MTS 8310	Version: 2.0.0.0			



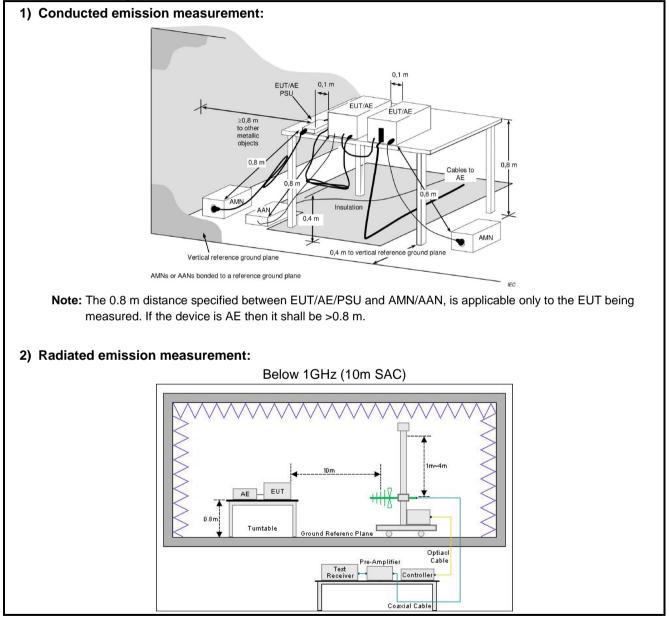
5 Measurement Setup and Procedure

5.1 Test Channel

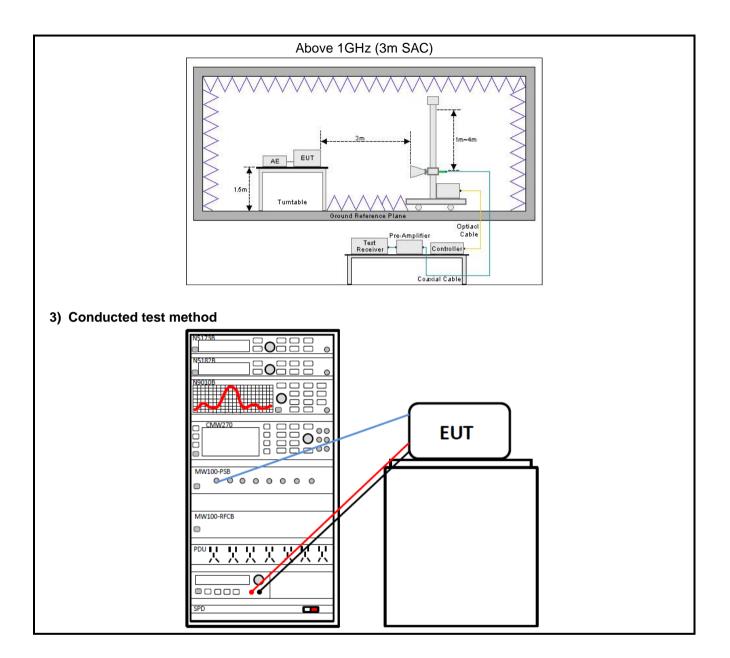
According to ANSI C63.10-2013 chapter 5.6.1 Table 4 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

Lowe	Lowest channel		le channel	Highest channel		
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	
1	2405	8	2440	16	2480	

5.2 Test Setup







Project No.: JYTSZR2205002



5.3 Test Procedure

Test method	Test step
Conducted emission	 The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
Radiated emission	 For below 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 10 m semi anechoic chamber. The measurement distance from the EUT to the reservice setures in 10 m.
	the receiving antenna is 10 m. 2. EUT works in each mode of operation that needs to be tested , and having
	 Lor works in each mode of operation that needs to be tested , and naving the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
	For above 1GHz:
	 The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m.
	2. EUT works in each mode of operation that needs to be tested, and having
	 the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test point of the test antenna and test turntable.
Conducted test mather-	the test, save the test results, and export the test data.
Conducted test method	 The BLE antenna port of EUT was connected to the test port of the test system through an RF cable. The EUT is keeping in continuous transmission mode and tested in all modulation modes.
	3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.



6 Test Results

6.1 Summary

6.1.1 Clause and Data Summary

Test items	Standard clause	Test data	Result
Antenna Requirement	15.203 15.247 (b)(4)	See Section 6.2	Pass
AC Power Line Conducted Emission	15.207	See Section 6.3	Pass
Duty Cycle	ANSI C63.10-2013	Appendix A - Zigbee	N/A
Conducted Output Power	15.247 (b)(3)	Appendix A - Zigbee	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Appendix A - Zigbee	Pass
Power Spectral Density	15.247 (e)	Appendix A - Zigbee	Pass
Band-edge Emission Conduction Spurious Emission	15.247 (d)	Appendix A - Zigbee	Pass
Emissions in Restricted Frequency Bands	15.205 15.247 (d)	See Section 6.4	Pass
Emissions in Non-restricted Frequency Bands	15.209 15.247(d)	See Section 6.5	Pass

2. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).

 ANSI C63.10-2013

 KDB 558074 D01 15.247 Meas Guidance v05r02



6.1.2 Test Limit

Test items	Limit							
	Г	Frequency		Limit (d	ΒμV)			
		(MHz)		si-Peak	Average			
AC Power Line Conducted	-	0.15 – 0.5		56 Note 1	56 to 46 Note 1			
Emission	-	0.5 – 5		56 60	46 50			
	-	5 – 30 Note 1: The limit level in dBµ						
		Note 2: The more stringent li			n or nequency.			
Conducted Output Power	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.							
6dB Emission Bandwidth	The	minimum 6 dB bandw	Hz.					
99% Occupied Bandwidth	N/A							
Power Spectral Density	inten		antenna shall	not be greate	density conducted from er than 8 dBm in any 3 k sion.			
Band-edge Emission Conduction Spurious Emission	spec frequ dB b highe radia the p powe perm this p limits which	trum or digitally modu- uency power that is pr elow that in the 100 k est level of the desire- ated measurement, pr beak conducted powe er limits based on the nitted under paragraph baragraph shall be 30 s specified in §15.209	Ilated intentior oduced by the Hz bandwidth d power, base ovided the tra r limits. If the t use of RMS a h (b)(3) of this dB instead of (a) is not requi- bands, as def	nal radiator is intentional radiator is within the ba d on either an nsmitter dem ransmitter co veraging ove section, the 20 dB. Atten ired. In additi ined in §15.2	adiator shall be at least and that contains the n RF conducted or a onstrates compliance w mplies with the conducter on a time interval, as attenuation required un uter a time interval, as attenuation the gener on, radiated emissions 05(a), must also comply	vith ted der al		
		Frequency		BμV/m)	Detector			
		(MHz) 30 – 88	@ 3m	@ 10m	Queci nach			
Emissions in Restricted		30 – 88 88 – 216	40.0 43.5	30.0 33.5	Quasi-peak Quasi-peak			
Frequency Bands		216 - 960	45.5	36.0	Quasi-peak			
r requericy Darius		960 - 1000	54.0	44.0	Quasi-peak			
	N	ote: The more stringent limit			dddoi pour			
Emissions in Non-restricted				Limit (dBµV/r	n) @ 3m			
Frequency Bands		Frequency	Ave	rage	Peake			
		Above 1 GHz	54	1.0	74.0			
	Ν	ote: The measurement band	width shall be 1 M	Hz or greater.				
	_					-		



6.2 Antenna requirement

Standard requirement: FCC Part 15 C Section 15.203 /247(b)(4)

15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

E.U.T Antenna:

The Zigbee antenna is an Internal antenna which cannot replace by end-user, the best case gain of the antenna is 3.79 dBi. See product internal photos for details.



Product name:	Sma	art Ceiling L	TE Gatewa	/	Produ	ict model:	DSC	GW-090	
est by:	Jane	et			Test r	node:	Tx n	node	
est frequency:	150	kHz ~ 30 N	ЛНz		Phase	e:	Line)	
est voltage:	AC 1	120 V/60 H	Z		Envir	onment:	Tem	າ p: 22.5 ℃	Huni: 55%
Leve	el (dBuV)								
90									
79.0									
68.0							FCC	PART 15.24	7 OP
57.0								PART 15.247	
46.0 1		4					0	9 11	
35.0	MARANAM	May In	A.(Northerstapper	munder Anton	Hub Will Alle Unit	2
24.0	MARIA A.	MA MAM	THE PARTY AND A	malady	Munum	CERCIT.	in such a	WANNER	Alle
	vininiiwe^	"WARMAN	And Interest	100 bot ales	adementer	around with the	- and the second of the	and doth 1	
13.0	411154	1.1	West March	and the second					
2.0		-							
-9.0					-				
-20 15	2	5	1	2		5	10	20	30
-20.15 Trace: 9	.2	.5	1	2 Frequen	cy (MHz)	5	10	20	30
.15	.2			Frequen	cy (MHz)		376		30
.15		Read	LISN	Frequen Cable		Limit	Over		30
.15	.2 Freq	Read		Frequen	cy (MHz) Level		Over		30
.15		Read	LISN	Frequen Cable		Limit	Over	Remark	30
.15	Freq MHz	Read Level dBuV	LISN Factor dB	Frequen Cable Loss	Level dBuV	Limit Line dBuV	Over Limit dB	Remark	30
.15 Trace: 9 	Freq MHz 0.162 0.170	Read Level dBuV 41.61 26.08	LISN Factor dB 0.04 0.04	Frequen Cable Loss dB 0.01 0.01	Level dBuV 41.66 26.13	Limit Line dBuV 65.34 54.94	Over Limit dB -23.68 -28.81	Remark QP Average	 8
.15 Trace: 9 	Freq MHz 0.162 0.170 0.369	Read Level dBuV 41.61 26.08 35.39	LISN Factor dB 0.04 0.04 0.04	Frequen Cable Loss dB 0.01 0.01 0.03	Level dBuV 41.66 26.13 35.46	Limit Line dBuV 65.34 54.94 48.52	Over Limit 	Remark QP Average Average	 8
.15 Trace: 9 1 2 3 4 5	Freq MHz 0.162 0.170 0.369 0.369	Read Level dBuV 41.61 26.08 35.39 46.55	LISN Factor dB 0.04 0.04 0.04 0.04 0.04	Frequen Cable Loss dB 0.01 0.01 0.03 0.03	Level dBuV 41.66 26.13 35.46 46.62	Limit Line dBuV 65.34 54.94 48.52 58.52	Over Limit 	Remark QP Average Average QP	 e e
.15 Trace: 9 1 2 3 4 5	Freq MHz 0.162 0.170 0.369	Read Level dBuV 41.61 26.08 35.39	LISN Factor dB 0.04 0.04 0.04	Frequen Cable Loss dB 0.01 0.01 0.03 0.03 0.03 0.03	Level dBuV 41.66 26.13 35.46 46.62 31.74	Limit Line dBuV 65.34 54.94 48.52 58.52 46.00	Over Limit 	QP Average QP Average QP Average	 e e
.15 Trace: 9 1 2 3 4 5 6 7	Freq MHz 0.162 0.170 0.369 0.369 0.502 0.502 0.502 0.822	Read Level dBuV 41.61 26.08 35.39 46.55 31.67 40.96 17.73	LISN Factor dB 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	Frequen Cable Loss dB 0.01 0.03 0.03 0.03 0.03 0.03 0.03 0.03	Level dBuV 41.66 26.13 35.46 46.62 31.74 41.03 17.80	Limit Line dBuV 65.34 54.94 48.52 58.52 46.00 56.00 46.00	Over Limit -23.68 -28.81 -13.06 -11.90 -14.26 -14.97 -28.20	Remark QP Average QP Average QP Average QP	 e e
.15 Trace: 9 1 2 3 4 5 6 7 8	Freq MHz 0.162 0.170 0.369 0.369 0.502 0.502 0.822 7.368	Read Level dBuV 41.61 26.08 35.39 46.55 31.67 40.96 17.73 39.43	LISN Factor dB 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	Frequen Cable Loss dB 0.01 0.03 0.03 0.03 0.03 0.03 0.03 0.03	Level dBuV 41.66 26.13 35.46 46.62 31.74 41.03 17.80 39.69	Limit Line dBuV 65.34 54.94 48.52 58.52 46.00 56.00 46.00 60.00	Over Limit -23.68 -28.81 -13.06 -11.90 -14.26 -14.97 -28.20 -20.31	Remark QP Average Average QP Average QP Average QP	 e e
.15 Trace: 9 1 2 3 4 5 6 7 8 9	Freq MHz 0.162 0.170 0.369 0.369 0.369 0.502 0.502 0.822 7.368 13.408	Read Level dBuV 41.61 26.08 35.39 46.55 31.67 40.96 17.73 39.43 42.27	LISN Factor dB 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	Frequen Cable Loss dB 0.01 0.03 0.03 0.03 0.03 0.03 0.03 0.03	Level dBuV 41.66 26.13 35.46 46.62 31.74 41.03 17.80 39.69 42.63	Limit Line dBuV 65.34 54.94 48.52 58.52 46.00 56.00 46.00 60.00 60.00	Over Limit -23.68 -28.81 -13.06 -11.90 -14.26 -14.97 -28.20 -20.31 -17.37	Remark QP Average QP Average QP Average QP Average QP QP	 e e e
.15 Trace: 9 1 2 3 4 5 6 7 8	Freq MHz 0.162 0.170 0.369 0.369 0.502 0.502 0.822 7.368	Read Level dBuV 41.61 26.08 35.39 46.55 31.67 40.96 17.73 39.43 42.27 35.50	LISN Factor dB 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.0	Frequen Cable Loss dB 0.01 0.03 0.03 0.03 0.03 0.03 0.03 0.03	Level dBuV 41.66 26.13 35.46 46.62 31.74 41.03 17.80 39.69	Limit Line dBuV 65.34 54.94 48.52 58.52 46.00 56.00 46.00 60.00 50.00 60.00	Over Limit dB -23.68 -28.81 -13.06 -11.90 -14.26 -14.97 -28.20 -20.31 -17.37 -14.06 -16.90	Remark QP Average QP Average QP Average QP QP Average	 e e e

6.3 AC Power Line Conducted Emission

1. An initial pre-scan was performed on the line and neutral lines with peak detector.

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. Final Level =Receiver Read level + LISN Factor + Cable Loss.



Product name:	Smart	Ceiling LTE	Gateway		Produc	t model:	DSGW	-090	
Fest by:	Janet				Test m	ode:	Tx mod	le	
Test frequency:	150 kH	lz ~ 30 MHz	7		Phase:		Neutral		
Test voltage:	AC 120	0 V/60 Hz			Enviror	nment:	Temp:	22.5℃	Huni: 55%
90 Lev	el (dBuV)								
79.0									_
68.0							FCC D	ART 15.247	OP
57.0		7				_		ART 15.247	
46.0	A	1					8	9 12	
35.0	Mann	Mul your	V-WHWWWHERE BALAN	hat we there we have the	wipelpalaternam	de ander and the state	reformation which which	WHITHERE AND A	lat.
24.0	Manny	M-IN MARY	Variation of the state	the about the second	manulity	A completions		a sa	A A
13.0									
2.0	_								
-9.0									
-20									
-20.15 Trace: 11	.2	.5	1	2 Frequenc	y (MHz)	5	10	20	30
nuce. II									
	144	Read	LISN	Cable	1	Limit	Over	21	
	Freq	Level	Factor	Loss	Level	Line	Limit	Remark	
	MHz	dBuV	dB	dB	dBuV	dBu∛	dB		
1	0.369	51.61	0.04	0.03	51.68	58.52	-6.84	OP	
2	0.373	42.92	0.04	0.03	42.99	48.43	-5.44	Average	
		20 57	0.04	0.03	39.64	40 05	-6.41	Average	е
3	0.497	39.57							
3 4 5	0.497	44.17	0.04	0.03	44.24	56.05	-11.81	QP	
1 2 3 4 5 6	0.497 0.743 0.943	44.17 37.35 28.93	0.04 0.04 0.05	0.03 0.03 0.04	44.24 37.42 29.02	56.05 56.00 46.00	-11.81 -18.58 -16.98	QP QP Average	e
6 7	0.497 0.743 0.943 7.935	44.17 37.35 28.93 31.72	0.04 0.04 0.05 0.16	0.03 0.03 0.04 0.10	44.24 37.42 29.02 31.98	56.05 56.00 46.00 50.00	-11.81 -18.58 -16.98 -18.02	QP QP Average Average	e
6 7 8	0.497 0.743 0.943 7.935 7.935	44.17 37.35 28.93 31.72 41.05	0.04 0.04 0.05 0.16 0.16	0.03 0.03 0.04 0.10 0.10	44.24 37.42 29.02 31.98 41.31	56.05 56.00 46.00 50.00 60.00	-11.81 -18.58 -16.98 -18.02 -18.69	QP QP Average Average QP	e
6 7 8 9 10	0.497 0.743 0.943 7.935 7.935 16.226 18.232	44.17 37.35 28.93 31.72 41.05 43.68 38.28	0.04 0.04 0.05 0.16 0.16 0.26 0.28	0.03 0.03 0.04 0.10 0.10 0.16 0.15	44.24 37.42 29.02 31.98 41.31 44.10 38.71	56.05 56.00 46.00 50.00 60.00 60.00 50.00	-11.81 -18.58 -16.98 -18.02 -18.69 -15.90 -11.29	QP QP Average QP QP Average	e e
6 7 8 9	0.497 0.743 0.943 7.935 7.935 16.226	44.17 37.35 28.93 31.72 41.05 43.68	0.04 0.04 0.05 0.16 0.16 0.26	0.03 0.03 0.04 0.10 0.10 0.10	44.24 37.42 29.02 31.98 41.31 44.10	56.05 56.00 46.00 50.00 60.00 50.00 50.00 50.00	-11.81 -18.58 -16.98 -18.02 -18.69 -15.90 -11.29	QP QP Average QP QP Average Average	e e

2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3. Final Level =Receiver Read level + LISN Factor + Cable Loss.



oduct	t Na	ame:	Smart Ce	iling L	TE Gateway		Product mod	del: [DSGW-090	
est By:	:		Janet				Test mode:	Г	Tx mode	
est Ch	anı	nel:	Lowest channel			Lowest channel Polarization:		Lowest channel Polarization: Vertical		
est Vo	Itag	ge:	AC 120V/	/60HZ	2		Environmen	t: T	`emp: 24 ℃	Huni: 57%
Level[dBµV/m]	120 110 100 90 80 70 60 50 40) - - - - - - - - - - - - - - -		2		FCC PART 1	5 C	5	FCC PAR	
	30 20 10 2.)	AV Limit		2.3415G 2. - Vertical PK Vertical	352G 2.3625G Frequency[F cal AV		2 3835G 2	394G 2.4045	5G 2415G
Susp	20 10 0 2.	31G 2:	← AV Limi or ◆ AV De	t —		Frequency[H		2.3835G 2.	394G 2.4045	5G 2.415G
Susp NO.	20 10 0 2.	31G 2: PK Limit PK Detect	← AV Limi or ◆ AV De	t		Frequency[H		2 3835G 2. Margin [dB]	394G 2.4045	5G 2.415G Polarity
NO.	20 10 0 2.	316 2: PK Limit PK Detect Cted Datz Freq. [MHz] 2330.00	→ AV Limi or → AV De	t tector ng (m]	- Vertical PK Vertical PK Vertical PK	Frequency(F al AV Factor	Limit	Margin		
NO.	20 10 0 2.	→ → → → → → → → → → → → → → → → → → →	→ AV Limi → AV De List Readii [dBµV/	t ttector /m] 3	- Vertical PK Vertic Level [dBµV/m]	Frequency(F al AV Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
NO.	20 10 0 2.	316 2: PK Limit PK Detect Cted Datz Freq. [MHz] 2330.00	AV Limit AV De AV DE	ng /m] 3 4	- Vertical PK — Vertic Level [dBµV/m] 57.34	Frequency(F al AV Factor [dB] 35.41	Limit [dBµV/m] 74.00	Margin [dB] 16.66	Trace PK	Polarity Vertical
NO. 1 2	20 10 0 2.	→ → → → → → → → → → → → → → → → → → →	 AV Limit AV De AV De	ng /m] 3 4 3	- Vertical PK — Vertic Level [dBµV/m] 57.34 48.25	Frequency(F al AV Factor [dB] 35.41 35.41	Limit [dBµV/m] 74.00 54.00	Margin [dB] 16.66 5.75	TracePKAV	Polarity Vertical Vertical
NO. 1 2 3	20 10 0 2.	Cted Data Freq. [MHz] 2330.00 2330.00 2360.00	→ AV Limi → AV De List Readin [dBµV/ 21.93 12.84 12.43	ng /m] 3 4 3 4	- Vertical PK — Vertic [dBµV/m] 57.34 48.25 48.06	Frequency[F al AV Factor [dB] 35.41 35.41 35.63	Limit [dBµV/m] 74.00 54.00 54.00	Margin [dB] 16.66 5.75 5.94	TracePKAVAV	Polarity Vertical Vertical Vertical

6.4 Emissions in Restricted Frequency Bands



25t Voltage	el:	Janet Lowest channe AC 120V/60HZ		FCC PART 15 C	Test mod Polarizati Environm	ion:		C Huni: 579
120 110 100 90 80 80 70 60 80 40 30 20 10				FCC PART 15 C	Environm		Temp: 24°C	TT T5 C-PK Limit
110 100 90 80 70 60 30 40 30 20 10		AC 120V/60HZ	2	FCC PART 15 C		ent:	FCCPAF	TT T5 C-PK Limit
110 100 90 80 70 60 30 40 30 20 10				FCC PART 15 C		5 5		
2.310	IG 2.32050	G 2.331G	2.3415G 2.352	2G 2.3625G Frequency[Hz]		2.3835G 2.39	94G 2.4045	5G 2.415G
Suspect	PK Limit PK Detector	 AV Detector 	lorizontal PK — Horiz					
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1 23	330.0000	22.55	57.96	35.41	74.00	16.04	PK	Horizontal
2 23	330.0000	12.77	48.18	35.41	54.00	5.82	AV	Horizontal
3 23	360.0000	12.60	48.23	35.63	54.00	5.77	AV	Horizontal
4 23	360.0000	22.23	57.86	35.63	74.00	16.14	PK	Horizontal
5 23	390.0000	22.32	58.16	35.84	74.00	15.84	PK	Horizontal
6 23	390.0000	12.46	48.30	35.84	54.00	5.70	AV	Horizontal



ouuci	Name:	Smart Ceiling	LTE Gateway		Product m	nodel:	DSGW-090	
est By:		Janet			Test mode	e:	Tx mode	
est Cha	annel:	Highest channel			Polarizatio	on:	Vertical	
est Vol	tage:	AC 120V/60H	IZ		Environm	ent:	Temp: 24℃	Huni: 57%
	120 110 90 80 70 60 50 40 30 20 10 0		248256 2.48		2.49G	24925G 2.	FCC PAR 5	RT 15 C-PK Limit
	2.475G 2.47 PK Limit PK Detecto	AV Limit AV Detector	- Vertical PK Vertica	Frequency[Hz]	2.100	2.49230 23	4000 2.4010	G 2.5G
Susp	PK Limit PK Detecto	AV Limit AV Detector		al AV			1000 2.4010	G 2.5G
Susp NO.	 PK Limit PK Detecto 	AV Limit AV Detector	- Vertical PK Vertica Level [dBµV/m]		Limit [dBµV/m]	Margin [dB]	Trace	Polarity
<u> </u>	PK Limit PK Detector ected Data Freq. [MHz] 2483.50	AV Limit AV Detector	Level	Factor	Limit	Margin		
NO. 1 2	PK Limit PK Detector PK Detector Ected Data Freq. [MHz] 2483.50 2483.50	AV Limit AV Detector List Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
NO.	 → PK Limit ◆ PK Detecto ected Data Freq. [MHz] 2483.50 2483.50 2489.00	AV Limit AV Detector List Reading [dBµV/m] 23.33	Level [dBµV/m] 59.05	Factor [dB] 35.72	Limit [dBµV/m] 74.00	Margin [dB] 14.95	Trace PK	Polarity Vertical
NO. 1 2	PK Limit PK Detector PK Detector PK Detector PK Limit PK Detector PK Limit PK Detector PK Limit PK Detector 2483.50 2483.50 2489.00 2489.00	AV Limit AV Detector List Reading [dBµV/m] 23.33 14.63	Level [dBµV/m] 59.05 50.35	Factor [dB] 35.72 35.72	Limit [dBµV/m] 74.00 54.00	Margin [dB] 14.95 3.65	TracePKAV	Polarity Vertical Vertical
NO. 1 2 3	 → PK Limit ◆ PK Detecto ected Data Freq. [MHz] 2483.50 2483.50 2489.00	AV Limit	Level [dBµV/m] 59.05 50.35 48.23	Factor [dB] 35.72 35.72 35.71	Limit [dBµV/m] 74.00 54.00 54.00	Margin [dB] 14.95 3.65 5.77	TracePKAVAV	Polarity Vertical Vertical Vertical

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.



ouuor	Name:	Smart Ceiling LTE	E Gateway		Product mo	del: D	SGW-090	
est By:		Janet			Test mode:	Т	x mode	
est Cha	innel:	Highest channel			Polarization	: н	lorizontal	
est Volt	age:	AC 120V/60HZ			Environmen	nt: T	ີemp: 24℃	Huni: 57%
	120 110 90 80 70 60 50 40			FCC PART 15 (FCC PA	RT 15 C-PK Limit
L	30 20 10 0		2 4825G 2 4850 Ionzontal PK — Horizo	Frequency[Hz]		2.4925G 2.4	95G 2.497	5G 2.5G
	30 20 10 2.475G 2 PK Limit	← AV Limit ← F or ◆ AV Detector		Frequency[Hz]		2 4925G 2.4	95G 2.497	56 2.56
	30 20 10 2.475G 2 PK Limit • PK Dete	← AV Limit ← F or ◆ AV Detector		Frequency[Hz]		24925G 2.4 Margin [dB]	95G 2497 Trace	5G 2.5G Polarity
Susp	30 20 10 0 2.475G 2 PK Limit ◆ PK Dete ected Dat Freq.	or → AV Limit → F AV Detector → AV Limit → F	lorizontal PK — Horizo	Frequency[Hz]	Limit	Margin		
Susp NO.	30 20 10 0 2.475G 2 PK Limit • PK Dete ected Dat Freq. [MHz]	a List Reading [dBµV/m] 0 26.25	lorizontal PK — Horizo Level [dBµV/m]	Frequency[Hz]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
Susp NO. 1	30 20 10 0 2.475G 2 PK Limit ◆ PK Dete ected Dat Freq. [MHz] 2483.500	a List Reading [dBµV/m] 0 26.25 0 17.13	Level [dBµV/m] 61.97	Frequency[Hz]	Limit [dBµV/m] 74.00	Margin [dB] 12.03	Trace PK	Polarity Horizontal
Susp NO. 1 2	30 20 10 0 2.475G 2 PK Limit ◆ PK Dete ected Dat Freq. [MHz] 2483.500 2483.500	AV Limit AV Detector A List Reading [dBμV/m] 0 26.25 0 17.13 0 12.67	Level [dBµV/m] 61.97 52.85	Frequency[Hz]	Limit [dBµV/m] 74.00 54.00	Margin [dB] 12.03 1.15	Trace PK AV	Polarity Horizontal Horizontal
Susp NO. 1 2 3	30 20 10 2.475G 2 PK Limit • PK Dete ected Dat Freq. [MHz] 2483.500 2483.500 2489.000	a List Reading [dBµV/m] 0 26.25 0 17.13 0 12.67 0 22.73	Level [dBµV/m] 61.97 52.85 48.38	Frequency[Hz]	Limit [dBµV/m] 74.00 54.00 54.00	Margin [dB] 12.03 1.15 5.62	Trace PK AV AV	Polarity Horizontal Horizontal Horizontal



6.5 Emissions in Non-restricted Frequency Bands

Below 1GHz:

Product Name:	Smart Ceiling	LTE Gatewa	ıy	Pro	oduct model:	DSGW-09	90
est By:	Janet			Те	st mode:	Tx mode	
est Frequency:	30 MHz ~ 1 G	Hz		Ро	larization:	Vertical &	Horizontal
est Voltage:	AC 120V/60H	Z		En	vironment:	Temp: 24	.℃ Huni: 57%
			Full Spec	trum			
			* *			FCC PART 15.2	247-10 m
10-10- 0	50 60	+	Freque	200 ncy in Hz T 15.247 10 m Result 1V-PK+	· · · · · · · · · · · · · · · · · · ·	500 a	4 1 800 1G QPK
10 0 30M * Critica Previe Frequency			Freque FCC PAR Preview F	ncy in Hz T 15.247 10 m Result 1V-PK+ Height	n 🔶	Final_Result (QPK Corr.
10- 0- 30M * Critica Previe Frequency (MHz)	LFreqs PK+ w Result 1H-PK MaxPeak (dB µ V/m)	+ Limit (dB ¥ V/m)	Freque FCC PAR Preview F Margin (dB)	ncy in Hz T 15.247 10 m Result 1V-PK+ Height (cm)	Pol	Final_Result (Azimuth (deg)	QPK Corr. (dB/m)
10- 0- 30M * Critica Previa Frequency (MHz) 50.370000	LFreqs PK+ w Result 1H-PK MaxPeak (dB µ V/m) 26.50	+ Limit (dB µ V/m) 30.00	Freque FCC PAR Preview F Margin (dB) 3.50	ncy in Hz T 15.247 10 m Result 1V-PK+ Height (cm) 100.0	n 🔶	Final_Result (Azimuth (deg) 106.0	QPK Corr. (dB/m) -15.8
10- 0- 30M * Critica Previe Frequency (MHz) 50.370000 60.207000 98.385000	L Freqs PK+ w Result 1H-PK (dB µ V/m) 26.50 29.70 24.82	+ Limit (dB µ V/m) 30.00 30.00 33.50	Freque FCC PAR Preview F Margin (dB) 3.50 1.38 8.68	ncy in Hz T 15.247 10 m Result 1V-PK+ Height (cm) 100.0 102.0 100.0	Pol V V V V	Final_Result (Azimuth (deg) 106.0 162.0 54.0	QPK (dB/m) -15.8 -16.4 -19.0
10- 0- 30M * Critica Previe Frequency (MHz) 50.370000 60.207000 98.385000 106.630000	L Freqs PK+ w Result 1H-PK (dB µ V/m) 26.50 29.70 24.82 24.59	+ Limit (dB µ V/m) 30.00 30.00 33.50 33.50	Freque FCC PAR Preview F Margin (dB) 3.50 1.38 8.68 8.91	ncy in Hz T 15.247 10 m Result 1V-PK+ (cm) 100.0 102.0 100.0 100.0	Pol V V V V V	Final_Result (Azimuth (deg) 106.0 162.0 54.0 139.0	QPK (dB/m) -15.8 -16.4 -19.0 -18.3
10- 0- 30M * Critica Previe Frequency (MHz) 50.370000 60.207000 98.385000	L Freqs PK+ w Result 1H-PK (dB µ V/m) 26.50 29.70 24.82	+ Limit (dB µ V/m) 30.00 30.00 33.50	Freque FCC PAR Preview F Margin (dB) 3.50 1.38 8.68	ncy in Hz T 15.247 10 m Result 1V-PK+ Height (cm) 100.0 102.0 100.0	Pol V V V V	Final_Result (Azimuth (deg) 106.0 162.0 54.0	QPK (dB/m) -15.8 -16.4 -19.0
10- 0 30M * Critica Previe Frequency (MHz) 50.370000 60.207000 98.385000 106.630000 155.615000 286.759000	L Freas PK+ w Result 1H-PK (dB µ V/m) 26.50 29.70 24.82 24.59 22.59 18.42	+ Limit (dB µ V/m) 30.00 30.00 33.50 33.50 33.50 36.00	Freque FCC PAR Preview F (dB) 3.50 1.38 8.68 8.91 10.91 17.58	ncy in Hz T 15.247 10 m Result 1V-PK+ (cm) 100.0 102.0 100.0 100.0 100.0	Pol V V V V V V V V	Azimuth (deg) 106.0 162.0 54.0 139.0 175.0 0.0	QPK (dB/m) -15.8 -16.4 -19.0 -18.3 -15.5
10- 0 30M * Critica Previe Frequency (MHz) 50.370000 60.207000 98.385000 106.630000 155.615000 286.759000	L Freas PK+ w Result 1H-PK (dB µ V/m) 26.50 29.70 24.82 24.59 22.59 18.42 equency Qu	+ Limit (dB µ V/m) 30.00 30.00 33.50 33.50 33.50	Freque FCC PAR Preview F Margin (dB) 3.50 1.38 8.68 8.91 10.91 17.58 Limit Ma	ncy in Hz T 15.247 10 m Result 1V-PK+ (cm) 100.0 102.0 100.0 100.0 100.0	Pol V V V V V V V t Pol Azi	Final_Result (Azimuth (deg) 106.0 162.0 54.0 139.0 175.0	QPK (dB/m) -15.8 -16.4 -19.0 -18.3 -15.5 -14.3



Above 1GHz

		Tost ch	annel: Lowest ch	annol		
			tector: Peak Valu			
Frequencia	Deedlevel	De		[Maraia	
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization
4810.00	55.13	-9.60	45.53	74.00	28.47	Vertical
4810.00	55.50	-9.60	45.90	74.00	28.10	Horizontal
		Dete	ctor: Average Va	alue		
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization
4810.00	47.86	-9.60	38.26	54.00	15.74	Vertical
4810.00	49.48	-9.60	39.88	54.00	14.12	Horizontal
		Testal				
			annel: Middle ch			
	Dec 11	Det	ector: Peak Valu	F	Mensie	
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization
4880.00	55.23	-9.04	46.19	74.00	27.81	Vertical
4880.00	55.92	-9.04	46.88	74.00	27.12	Horizonta
		Dete	ctor: Average Va	alue		
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization
4880.00	47.16	-9.04	38.12	54.00	15.88	Vertical
4880.00	49.60	-9.04	40.56	54.00	13.44	Horizontal
		Test cha	annel: Highest cł	hannel		
		Det	ector: Peak Valu	le	T	
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarization
4960.00	55.18	-8.45	46.73	74.00	27.27	Vertical
4960.00	55.92	-8.45	47.47	74.00	26.53	Horizontal
		Dete	ctor: Average Va	alue		
Frequency (MHz)	Read Level (dBuV)	Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Polarizatio
	45.16	-8.45	36.71	54.00	17.29	Vertical
4960.00	45.10				1	

-----End of report-----