

Prüfbericht-Nr.: <i>Test report no.:</i>	CN23UHCQ (P15C-WPC) 001	Auftrags-Nr.: <i>Order no.:</i>	48215983	Seite 1 von 15 Page 1 of 15
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-02-18	
Auftraggeber: <i>Client:</i>	Annex Products Pty Ltd Como Center, Level 3 Suite 6A, 299 Toorak Road, South Yarra, VIC, Australia			
Prüfgegenstand: <i>Test item:</i>	OEM Wireless Charger 12V 1.8A Input(QL-5289), OEM Wireless Charger 12V 1.0A Input(QL-5290)			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	QL-5289, QL-5290			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.207 and 15.209			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2023-03-16			
Prüfmuster-Nr.: <i>Test sample no:</i>	A003435707-001 A003435707-011			
Prüfzeitraum: <i>Testing period:</i>	2023-03-23			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing Laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
zusammengestellt von: <i>compiled by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i>	2023-04-06	Ausstellungsdatum: <i>Issue date:</i>	2023-04-06	
Stellung / Position:	Assisantant Project Engineer	Stellung / Position:	Senior Project Manager	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
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. <i>This test report only 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 test mark.</i>				

V05

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.203	Antenna Requirement	Pass
5.1.2	15.209	Radiated Spurious Emissions	Pass
-	15.207	Mains Conducted Emission	Not Applicable

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN23UHCQ (P15C-WPC) 001	Original Release	2023-04-06

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix A - Test Result of Radiated Emissions

Appendix SP - Photographs of Test Setup

Appendix EP – Photographs of EUT

Test Specifications

The following standards were applied.

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.207 and 15.209
ANSI C63.10:2013

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Chinese Taipei

2.2 Test Facility

TUV Rheinland Taiwan Ltd.
Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Chinese Taipei
FCC Registration No.: 180491
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.30 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.30 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is an OEM Wireless Charger 12V 1.8A Input(QL-5289), OEM Wireless Charger 12V 1.0A Input(QL-5290). It contains WPC compatible modules enabling the user to charge the battery through a wireless interface.

For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	OEM Wireless Charger 12V 1.8A Input(QL-5289), OEM Wireless Charger 12V 1.0A Input(QL-5290)
Type Identification	QL-5289, QL-5290
FCC ID	2AOU9-QLO

Technical Specification of EUT

Item	EUT information
Operating Frequency	111– 205 kHz
Operation Voltage	12 Vdc
Modulation	FSK
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.3

Note:

1. All models are listed as below.

Model Type	Type Identification	Input Current	FW Version	Difference
Main	QL-5289	1.8A	A.1.0	The hardware is the same. The difference is the firmware and the model names are for marketing purpose.
Series	QL-5290	1A	B.1.0	

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Power on the EUT and put Load device on it. EUT will start providing wireless power. Power transmission and load status detection is done simultaneously using the fundamental frequency in the range of 111 – 205 kHz.

Test Software	None.
---------------	-------

The samples were used as follows:

A003435707-001

A003435707-011

Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To		Description
	Radiated Spurious Emissions	Mains Conducted Emission	
-	√	-	-

Note: "-" means no effect.

Radiated Spurious Emissions

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (kHz)	Tested Frequency (kHz)
-	111– 205	111– 205

Mains Conducted Emission

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (kHz)	Tested Frequency (kHz)
-	111– 205	111– 205

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Radiated Spurious Emissions	23.6-25.1 °C	60-62 %	Ray Huang

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

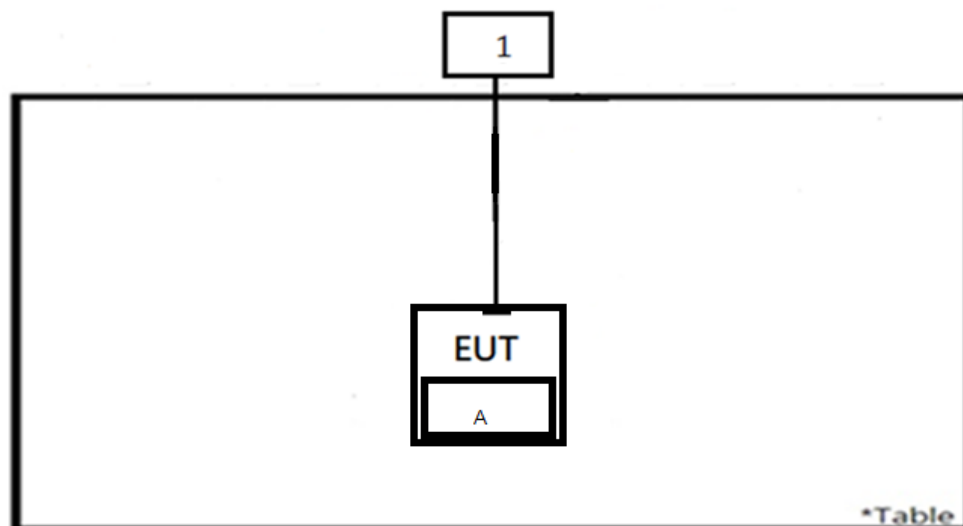
None.

Support Unit

No.	Description	Brand	Model	S/N	Remark
Radiated Test					
A	WPC load	YBZ	智能 RX 全功能測試模組 2.1	-	-
1	DC Power Supply	GWINSTEK	GPS-3030	-	-
Conducted Test					
-	Power Supply	GWINSTEK	GPS-3303	GEU915620	-
-	WPC load	YBZ	智能 RX 全功能測試模組 2.1	-	-

4.4 Test Setup Diagram

<Radiated Spurious Emissions mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

The antenna is Coil Antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Radiated Spurious Emissions

Limit

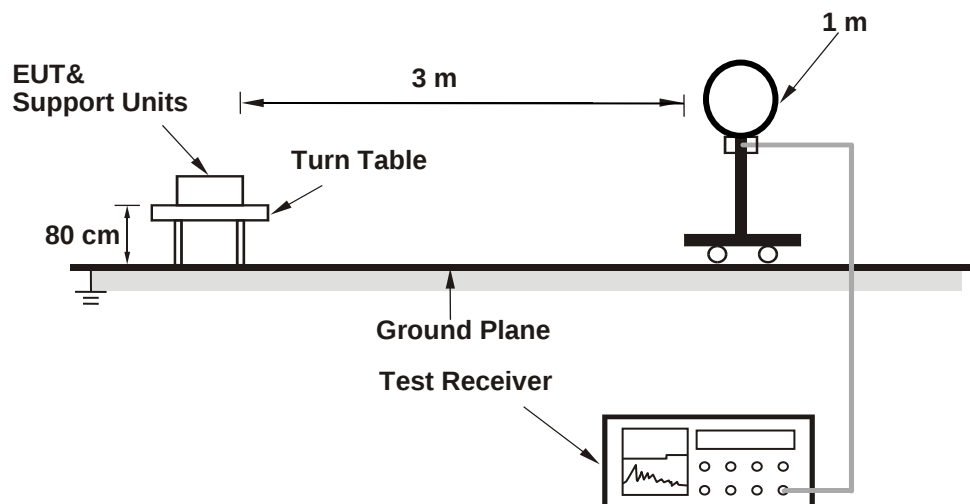
The field strength of any emissions shall not exceed the general radiated emission limits in §15.209 as below table:

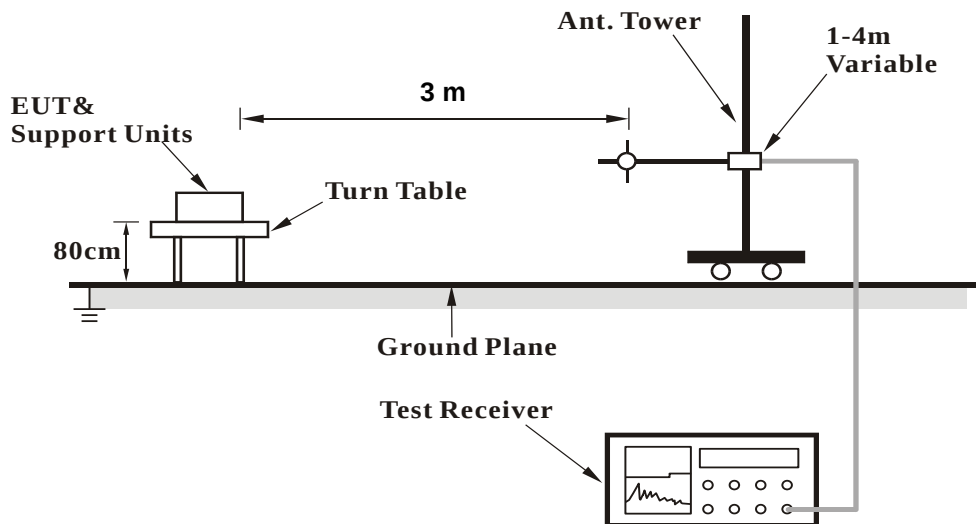
Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>


For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Test Date: 2023/3/23

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
30MHz ~ 1GHz					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Bilog Antenna	SCHWARZBECK	VULB-9168	00949	2022/5/29	2023/5/28
LF-AMP	Agilent	8447D	2727A05146	2023/2/16	2024/2/15
Below 1GHz					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2023/1/4	2024/1/3

Test Procedures**For Radiated Emissions below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.
3. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.

Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix A.

Appendix A: Test Results of Radiated Spurious Emissions

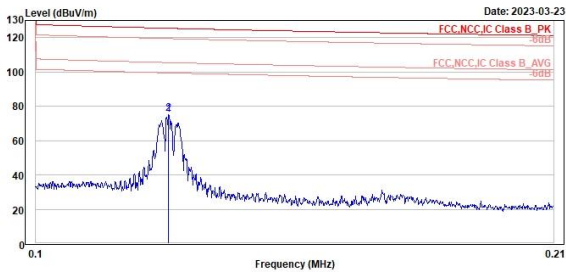
Fundamental Emissions, 100kHz ~ 210kHz

Open					Close						
TÜVRheinland Taiwan Ltd. No. 438-18, Sec. 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.) Tel: +886-2172-1000 Fax: +886-2172-1322 Date: 2023-03-23					TÜVRheinland Taiwan Ltd. No. 438-18, Sec. 2, Fenliao, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.) Tel: +886-2172-1000 Fax: +886-2172-1322 Date: 2023-03-23						
Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.128	82.83	64.80	18.03	105.44	-22.61	100	202	Average	Open	
2	0.128	85.00	66.97	18.03	125.44	-40.44	100	202	Peak	Open	
1	0.128	76.93	58.90	18.03	105.43	-28.50	100	119	Average	Close	
2	0.128	79.63	61.60	18.03	125.43	-45.80	100	119	Peak	Close	

Ground



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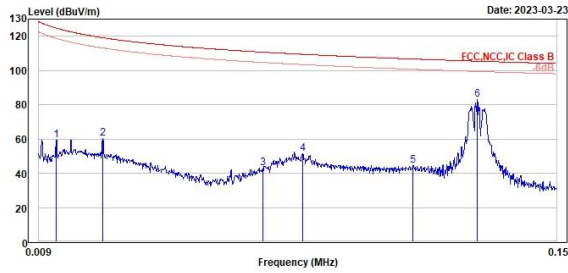
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	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.128	75.13	57.10	18.03	105.44	-30.31		100	204	Average	Ground	
2	0.128	75.53	57.50	18.03	125.44	-49.91		100	204	Peak	Ground	

Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

9kHz~150kHz(Open)



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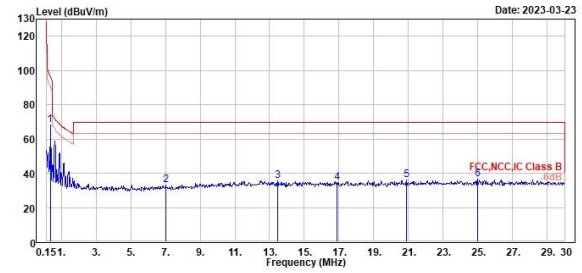


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.014	59.55	41.56	17.99	124.79	-65.24	100	233	Peak	Open		
2	0.026	60.07	41.12	18.95	119.13	-59.06	100	90	Peak	Open		
3	0.070	43.06	24.43	18.63	110.69	-67.63	100	211	Peak	Open		
4	0.081	51.20	32.83	18.37	109.44	-58.24	100	173	Peak	Open		
5	0.111	44.55	26.59	17.96	106.69	-62.14	100	211	Peak	Open		
6	0.128	82.90	64.67	18.03	105.42	-22.52	100	42	Peak	Open		

150kHz~30MHz(Open)



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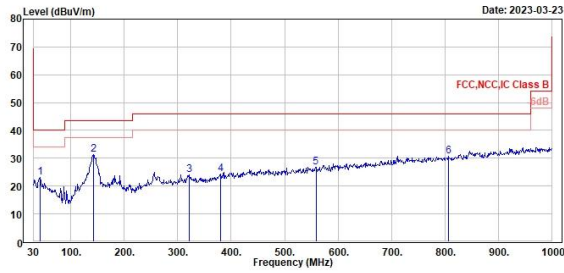
	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	0.359	68.37	49.59	18.78	96.50	-28.13	100	210	Peak	Open		
2	7.016	33.18	12.88	20.30	69.50	-36.32	100	210	Peak	Open		
3	13.463	35.47	13.63	21.84	69.50	-34.03	100	74	Peak	Open		
4	16.866	34.53	12.45	22.08	69.50	-34.97	100	350	Peak	Open		
5	20.866	35.96	13.65	22.31	69.50	-33.54	100	219	Peak	Open		
6	24.905	36.66	14.29	22.37	69.50	-32.04	100	126	Peak	Open		

Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

Horizontal



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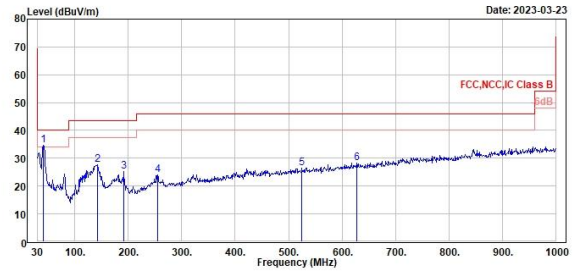


	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	41.640	23.17	30.64	-7.47	40.00	-16.83		300	69	Peak	Horizontal	
2	141.550	31.40	39.09	-7.69	43.50	-12.10		200	251	Peak	Horizontal	
3	321.000	24.05	29.87	-5.82	46.00	-21.95		100	249	Peak	Horizontal	
4	380.170	24.19	28.74	-4.55	46.00	-21.81		100	226	Peak	Horizontal	
5	558.650	26.81	28.76	-1.95	46.00	-19.19		100	134	Peak	Horizontal	
6	886.970	30.66	28.63	2.03	46.00	-15.34		400	11	Peak	Horizontal	

Vertical



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	Freq	Level	Read	Level	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	dB	cm	deg			
1	40.670	34.61	42.21	-7.60	40.00	-5.39		100	73	Peak	Vertical	
2	141.550	27.75	35.44	-7.69	43.50	-15.75		100	88	Peak	Vertical	
3	191.990	25.35	35.23	-9.88	43.50	-18.15		100	125	Peak	Vertical	
4	255.040	23.96	31.73	-7.77	46.00	-22.04		200	210	Peak	Vertical	
5	524.700	26.39	28.72	-2.33	46.00	-19.61		300	276	Peak	Vertical	
6	627.520	28.24	28.69	-0.45	46.00	-17.76		200	83	Peak	Vertical	